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THE SIGNIFICANCE OF AUDITORY AND VISUAL HALLUCINATIONS*

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As the subject of hallucinations covers the whole field of psychiatry it is clearly impossible to deal with more than certain aspects which lend themselves to subsequent discussion. Faulty perception is such a striking phenomenon that it is not surprising that it early attracted the attention of mental pathologists. For many generations psychiatrists have written profusely on the matter, but because of its many unsolved problems it continues to be a common subject for study and comment. My observations in this paper are psychological rather than neurological, and probably more theoretical than practical.

Definition; Relation to Illusions

The mental act of perception is a complex phenomenon necessitating the assimilation of the qualities of what is seen or heard with certain memories pertaining thereto. Faulty assimilation, or the addition of extraneous detail, results in faulty perception or illusion. Illusions may be normal, as in the interpretation of a few deft strokes by an artist as a human figure (creative synthesis of Wundt), or in the misinterpretation of distant or vague objects—for example, seeing the man in the moon or pictures in the fire (paradoileas). Alert attention and the absence of disturbing emotions are important for correct perception. Thus strained expectation, fear, and anxiety are common causes of illusions. The frightened individual walking along a lonely lane after dark is very prone to illusionary interpretation of what he sees or hears. Esquirol (1772–1840) was the first to distinguish clearly between illusions and hallucinations, and the present-day differentiation of these two phenomena follows the lines laid down by him. An illusion may be defined as a subjectively distorted perception of a real object; an hallucination as a mental image projected outwards as a perception in the absence of an external stimulus. Hallucinations, however, often make use of external objects—for example, passing footsteps, shadows on the wall—as their starting-point. Again, as no sense organ is ever entirely free from stimulus, it is theoretically possible that every hallucination has a peripheral stimulus. Thus positive scotomas are invariably present in the visual hallucinations of delirium tremens (Morel, 1932, 1933), and entotic sounds such as tinnitus are often the basis of auditory hallucinations. It follows that illusions and hallucinations usually differ little in significance, but in some cases it is important prognostically to differentiate between the two. Hallucinations in the manic-depressive are usually regarded as a schizophrenic admixture of bad prognostic significance, but a manic patient may have illusions of the paradoilea variety which are of no more significance than the normal seeing of pictures in the fire. For example, a young female manic was much preoccupied with lions prowling around her, which on investigation proved to be illusions originating in shadows on a bank outside her window.

Hallucinations in the Sane

While persistent hallucinations are a certain sign of grave and profound mental disorder, the experience of an occasional hallucination is by no means a rarity in the sane. Probably a third of us have such an experience at some time in our lives (Society for Psychical Research, 1894 report), the hallucination usually being of the hypnagogic variety—that is, in the state between sleeping and waking. The greater frequency of hallucinations in the sane in former ages and in primitive races is largely explained by the attitude of the times to such occult phenomena as spirits, witches, etc.—as are the hallucinations in susceptible communities commonest at times of religious ecstasy.

Many artists have a strong visual creative faculty which not infrequently results in frank hallucinations. Goethe relates how he could hallucinate at will an unfolding flower which he regarded as the archetype of all flowers; and it is related that the painter Montagna would ask those to step aside who got between him and the hallucinatory scene he was painting—possibly an example of eidetic imagery. Shelley, Byron, Tasso, and Schumann are examples of the many prominent personalities who are known to have had hallucinatory experiences, some of which were undoubtedly psychotic, while others seem to have been isolated phenomena. Similarly, many religious mystics—among others, Moses, St. Paul, Luther and his opponent Loyola, Joan of Arc, and George Fox the founder of the Quakers—have been subject to hallucinations. It is surely gross presumption to affix a psychiatric label to such people, and even to dub their experiences as hallucinatory is superficial nominalism. Is it possible that the deeply religious, in ecstatic moments, recover the clairvoyant powers formerly possessed by man, feeling and thinking in pictures in a manner unusual in these days of abstract thought? In

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this connexion it is highly significant that the concentration on a single group of ideas invariably associated with the ecstatic hallucinatory state is a profound preoccupation with those ideas, but without any abstract thought concerning them. The study of mythology leaves little doubt that at one time man understood his relation to Nature and his fellow-men by a process of intuition which he experienced by visions or pictures, whereas to-day he understands the same relations through a process of observation, experience, and thought, and appreciates such understanding by a process of abstract thinking. In this change over from perception through the spirit, or intuition, to perception through the senses and abstract thought, man unfortunately has lost the former method of experiencing. As this is probably a loss from disuse it is quite possible that man may yet regain it. If this surmise be correct our hallucinated poets, philosophers, and religious ecstatics, far from being psychotic, should be regarded rather as supermen capable of using both forms of experiencing—a conclusion, I submit, which their lives and works strongly support. Psychologically their hallucinations can be understood as a regression to a more primitive but not necessarily less efficient mode of experiencing.

Under hallucinations in the sane may be mentioned those interesting studies of hallucinations in hypnotic subjects. Hallucinations can be suggested in hypnosis and the post-hypnotic state, and crystal-gazing may induce visual hallucinations in certain healthy and hysterical subjects. It was a study of such hallucinations that led Morton Prince to enunciate his theory that visual hallucinations are the emergence into awareness of imagery belonging to subconscious thought and that auditory hallucinations are the similar emergence of subconscious verbal "images" or thoughts. Lundholm (1932), working with the conditioned-response method in post-hypnotic conditions, enunciated a hormic theory of hallucinations on the ground that the meaning of an object is determined by the conative attitude of the observer towards it.

Elementary Hallucinations

The simplest form of hallucination is the so-called elementary hallucination, consisting, in the case of sight, of flashes of light, colours, glare, etc., and, in the case of hearing, of vague sounds, noises, music, etc. The following is an interesting example of the rare phenomenon of the transformation of "noises" into music. A paraphrenic artist, during a course of triazol therapy, had distressing "noises" converted into operatic and orchestral music more perfect than he had ever experienced in reality. He was quite lacking in insight, and could not be persuaded that we, his friends, were not arranging wireless performances to drown the "noises" made by his enemies. Such hallucinations of music and singing are comparatively rare, except in some confusional states, particularly delirium tremens.

Aetiology and Psychopathology of Hallucinations

In this connexion it is important to differentiate between the acute hallucinations arising in a confused state and the subacute or chronic hallucinations arising when consciousness is clear.

(A) ACUTE HALLUCINATIONS

Perceptions are ordinarily distinguished from mental images by their objectivity, substantiality, and perceptive actuality (Wernicke), but it would seem that full consciousness is necessary for this differentiation. In states of acute confusion the mind exhibits dissociative phenomena similar to those met with in sleep; judgment and reasoning are in abeyance, associations are uninhibited, thoughts are incoherent and out of touch with reality. It is a strange fact that whenever this state arises mental images take on a sensory vividness which gives rise to hallucinations. Such hallucinations tend to be variable and dream-like, to affect several of the senses, and to result in a confused and fantastic experience. These hallucinations need bear no close relation to the ego, so that in delirium tremens the patient may even regard his visual hallucinations as a play put on for his amusement. Dreams with their hallucinatory vividness, hypnagogic hallucinations, and confusional hallucinosis are probably very similar. Neurologically they can be regarded as a release phenomenon, the cortical levels subserving consciousness being out of action, with resultant uninhibited activity of lower cortical and subcortical (most probably hypothalamic (Lhermitte, 1932)) levels. Ewald suggests that the prevalence of visual as opposed to auditory hallucinations in such conditions may be due to the localization of the ocular centres in the mid-brain near the waking centre. On the other hand, Ammann (1930) describes several cases of pseudo-hallucinations in eye disorders which he attributes to stimulation of the calcarine zone. Psychologically dissociation can be regarded as the causal mechanism, the conscious personality's possession of the stream of consciousness having been usurped by the subconscious with its lack of criticism of environmental happenings. Most recent Continental workers—for example, Schröder (1936), Claude, Ey—enunciate the rather extreme view that the clouding of consciousness is all-important and the sensory aspect of the hallucinations negligible, visual hallucinations in such cases being merely visual images wrongly interpreted as such by the impaired judgment. Schorsch's (1934) more general conclusion is that hallucinations arise when those biological processes which inform us about environment are suppressed by subjective factors.

(B) CHRONIC HALLUCINATIONS

While dissociation is still the important mechanism, there is not the profound cleavage of consciousness of the confused state. Instead, certain complexes are dissociated from the main stream of consciousness, and it is in connexion with these that hallucinations arise. That dissociation is all-important is shown by the absence of the hallucinations when the patient is occupied with reality, and their presence when attention slackens and the patient begins to day-dream. This day-dreaming is characteristic of the schizophrenic with his incessant preoccupation with certain obscure fears, suspicions, or presentiments. The primary factor is a changed affectivity which gives rise to a morbid egocentricity with associated complexes. Reality becomes of less interest than his self-centred preoccupations, and a struggle goes on within him between the life of reality and imagination till a state of distraction arises, a splitting of his personality, otherwise dissociation. To this emotionally aroused dissociation is added an overstimulation of the sense organs of sight and hearing by what can best be regarded as auto-suggestion (Gadelius, 1933). Just as strained expectation and fear may facilitate illusions, so here, under the prolonged influence of the egocentric affect, they keep the senses on the alert and ultimately deceive them by the formation of hallucinations. Thus it is that the hallucinations are really dissociated fragments of the patient's own complexes, his most hidden thoughts, his fears, anxieties, and suspicions, his repressed erotic desires, his dreams of greatness. Unlike acute hallucinosis, there is here a close relation between the

hallucinations and the patient's ego. This explains the compulsive power of some hallucinations which make the patient carry out actions that he would disregard if ordinarily commanded to do them.

A deaf paraphrenic artist with grandiose delusions "heard" the bell in the church belfry tolling "Climb higher, climb higher." The symbolical significance of this command is easily understood, but the patient took it literally, and proceeded at much risk to scale the church. I pointed out to him afterwards that there was no bell in the belfry, that bells did not speak, and that he was so deaf that even if a bell had been ringing he could not have heard it. He shook his head sadly, and remarked: "I must be going mad," but after due reflection, as described later, he gave delusional explanations of his impulsive act in accordance with the usual inability of the critical faculty of such patients to penetrate the hallucinatory complex in terms of reality.

From the practical point of view the most important aspect of all hallucinatory states is the effect on the patient's conduct. This renders it imperative that we should learn the content of his hallucinations and his attitude towards them, so that we can anticipate his behaviour and take the necessary steps to guard against any dangerous propensities to himself or to others.

Comparison of Visual and Auditory Hallucinations

Generally speaking, visual hallucinations are characteristic of the acute, and auditory hallucinations of the chronic, psychoses, and, owing to their greater tendency to become chronic, the latter are of more grave prognostic significance.

Visual perception is the principal means by which we appreciate and orient ourselves to our surroundings. This means that visual hallucinations appearing to a person with clear consciousness are usually palpably incongruous and abnormal. His belief in their reality is unlikely, unless fear, anxiety, or anticipatory desire is present, clouding his consciousness and destroying his critical faculty. Darkness encourages visual hallucinations and renders them less incongruous, so that in the psychoses without confusion visions are much more common at night. In confusional states the clouded consciousness appears to accept the visions as reality, and the patient reacts accordingly. When consciousness clears in such conditions it is usual for the visions to disappear, although auditory hallucinations if present may continue. This is seen in certain cases of delirium tremens, which pass into alcoholic hallucinosis or paranoia.

Things heard are much less differentiated from their surroundings than are things seen, so that to the patient, even with clear consciousness, auditory hallucinations are not necessarily incongruous or abnormal. It is much easier for the patient to explain away any incongruity of auditory hallucinations. For example, if no one else hears the "voices" it is because the patient has better hearing, or the "voices" are due to wireless, telepathy, etc.

It is doubtful whether auditory hallucinations in a clear setting have the objectivity, reality, and substantiality usually ascribed to them, or whether they are not rather in the nature of pseudo-hallucinations or psychic hallucinations. It is certainly very noticeable how often the patient who says he hears "voices" can give the meaning of what is said, but cannot repeat the actual words used. The deaf paraphrenic artist already mentioned argued with me that the hearing of "voices" by a deaf person was no more a sign of mental abnormality than the fact that to him colour was form, and beauty merely secondary to form. It merely meant that his powers of hearing and sight differed from the so-called normal. This example lends no support to the theories of such writers as Schröder, that the "voices" are just vivid mental images or thoughts detached by "passivity feelings" or "estrangement" of thinking; or of the French authors Claude and Ey (1932), that faulty belief in the reality of the hallucinations is the fundamental factor. Rather does it support the view of Mayer-Gross (1928) that the sensory elements in the hallucinations must also be regarded as of primary importance. The above patient was experiencing some novel auditory sensations which he could not find words to express; the best he could do was to say that bells were ringing out a message to him. This is very like the example cited by Mayer-Gross of the patient who could only describe as "pins and needles" the sensations he felt in a phantom limb. Morel's finding (1936) that patients are unable to compare the pitch and intensity of their "voices" with the sounds of the audiometer, though they can in the case of elementary hallucinations, is further evidence that such "voices" differ from ordinary hearing.

This objectivity of auditory hallucinations, whatever its nature, is not the principal reason for their overpowering effect on the patient. Compared with the visual sense, language, and therefore the spoken word, has a much closer contact with our inner life, our thoughts, our emotions, our desires, and endeavours, and it provides the most intimate contacts with the minds of our fellows. These are important factors in making auditory hallucinations highly significant to the patient, but most significant of all is the fact that the hallucinations are a final confirmation of long-harboured fears, suspicions, or hopes. These moods, as already explained, have in fact been largely causal of the hallucinations, and as they in turn are intensified by the hallucinations a vicious circle is set up, which goes a long way to explain how these hallucinations and associated delusions are impervious to reason and tend to persist.

In conclusion, I would like to report a case which has points of interest as regards both visual and auditory hallucinations. The patient is a woman aged 32, suffering from paraphrenia phantastica, who denies that she hears "voices" but states that much of what she says and thinks is repeated by a "voice" behind the top of her breastbone. She maintains that this "voice" belongs to a "Jim Walker," who, with several others, lives in her chest, and whose heads she can actually "see" there. The visual hallucinations are of the extracampine variety in that the location given by her for the "seen" heads is usually quite outside her range of vision. I suggest that when the patient says she "sees" such heads and denies that she only thinks she sees them, she is using the word "see," for want of a better, to describe some abnormal visual sensations she experiences; in other words, she illustrates that, at least in chronic visual hallucinations, the sensory element can be important. Apart from some cases of senile melancholia and senile dementia, the "thought resonance" type of auditory hallucination met with in this patient is only found in schizophrenia. It was originally described by Séglas (1895) and Cramer (1889) as a muscle sense or motor speech hallucination. In support of this theory they pointed out that the thought word is often accompanied by innervation of the centre for the spoken word, so that many people move their lips involuntarily when thinking, and physiologists have since shown that the laryngeal muscles are stimulated during thought; in other words, thinking is a form of subvocal talking. I would correlate the site of the present patient's hallucinatory voice "behind her breastbone" with the innervation of her laryngeal muscles in her subvocal thinking.

Summary

Hallucinations and delusions are defined and their relations to each other discussed.

An account is given of hallucinations in the sane and of elementary hallucinations.

In surveying the aetiology and psychopathology of hallucinations emphasis is laid on the importance of differentiating between the acute hallucinations arising in a confused state and the subacute or chronic hallucinations arising when consciousness is clear.

Comparison is made between visual and auditory hallucinations: an illustrative case shows the importance of sensory elements.

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NEUROLOGICAL ASPECT OF VISUAL AND AUDITORY HALLUCINATIONS*

BY

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The neurologist encounters clinical states of hallucinosis—either episodic or habitual—in a variety of pathological circumstances. One can briefly divide the aetiological factors into lesions which are focal and those which are diffuse. On the one hand there are the circumscribed lesions as represented by tumours and less often by vascular disease and injury. Perhaps, too, we should include here those cases of epilepsy and of migraine where hallucinations are conspicuous. Among the diffuse cerebral causes of hallucinations we may mention a number of toxi-infective states, such as delirium (associated with general infections, high fever, exhaustion, starvation, thirst), various drug intoxications, hypoglycaemia, etc. Outside this workaday grouping will lie a number of other neurological states where the genesis of the special sense phenomena is obscure. Here belong the interesting examples of hallucinations associated with narcolepsy (as well as with the manifestations of sleep in normal subjects), and various of the organic psychoses, as instanced by chronic epidemic encephalitis and by dementia paralytica.

Lastly, there are the so-called "hallucinations of the sane," which will include a diversity of phenomena. The neurologist is perhaps intruding into other provinces when he evinces interest in such obscure though important matters as veridical and telepathic dreams and hallucinations, phantasms of the dying and of the dead, collective or mass hallucinosis. He will be concerned, although perhaps remotely, with those subjective states which lie on the borderland of hallucination—such as, for example, the questions of hyperacute mental images, eidetic images, synaesthetic associations, "thought forms," "number forms"—especially as they concern those deprived of sight or hearing.

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Cerebral Tumour

Hallucinations are not uncommon symptoms in patients with cerebral tumour, whether as preludes to epileptiform incidents or as isolated events. The nature of the hallucinations; their special sense quality; their size, projection in space, degree of complexity, vividity, constancy, are all aspects which merit attention in case-taking, for these are factors which may at times have localizing significance. In very broad terms it may be said that the postero-inferior third of the cerebral hemisphere seems to be of the greatest significance when tumoral hallucinations are concerned—that is to say, the regions closely associated with the end-stations of the special sense pathways. Clinically we may therefore say that hallucinations are likely to be of importance in the diagnosis of lesions of the temporal or occipital parts of the brain.

It is not necessary to enter into details with regard to such a banal subject as the nature and frequency of hallucinations in cases of tumour involving this lobe or that. One may perhaps be content to recall that the hallucinations vary in degrees of complexity or crudity, though usually constant for the individual. With occipital tumours the hallucinations are generally visual in type, coloured, but otherwise relatively simple or formal. Flashes of light, balls of fire, stars, spots, zigzags, are fairly characteristic. They are usually projected into the contralateral visual field, which more often than not is a blind one.

When the tumour is situated more anteriorly the visual hallucinations may be far more complex, and may be associated with auditory phenomena. Thus in the case of a temporo-occipital growth recorded by I. M. Allen the patient said: "I see gold stars falling in front of me . . . then I see sort of wings flapping. Also I hear a sort of 'ha-ha'-ing in the ears; and sometimes a voice, a strange voice like nothing earthly, saying, 'Why have you not told me before? Why did you not tell me long ago?' Sometimes I see an old woman with a hood coming towards me. Then I feel a strange heavy sinking sensation in the pit of the stomach. Then I lose myself."

Visual hallucinations may also occur with temporal lobe tumours, possibly—as Cushing has thought—from damage to the optic radiations. Horrax noted visual hallucinations of a more or less definite and complex nature in twelve out of seventy-two cases of temporal lobe neoplasm and of a less defined character in another five.

Auditory hallucinations may also occur with temporal tumours, and may comprise crude akoasmic noises such as buzzing, roaring sounds, bells ringing, and the like. Elaborate sounds—for example, voices or music—occur rarely, and then usually in connexion with uncinate epileptic attacks. Kolodny noted an aura of "horrible noises" once only in his series of thirty-eight temporal tumours. In Cushing's clinic, auditory hallucinations occurred four times among ninety-nine temporal lobe tumours and, it is interesting to note, six times among ninety-nine frontal lobe tumours.

It would be irrelevant to discuss the complicated psychosensory phenomena which may accompany discharging lesions of the uncinate lobe, and which are familiar under the term "dreamy states." The special sense involvement

usually takes the forms of olfactory or olfacto-gustatory hallucinations; occasionally, however, visual and auditory components enter. Foster Kennedy has described visions of men and women dressed in eighteenth century court dress, of a beckoning woman dressed in blue, of roomfuls of negroes, as aurae of temporal or temporo-sphenoidal tumours. Dr. Symonds records that a patient of his used to see and hear an on-coming railway train which, as it approached, sounded louder and louder. Just as it was about to crash into the victim consciousness was lost. Still more elaborate poly- or inter-sensorial hallucinations have been recorded. Perhaps one of the most interesting patients in this connexion is the one of Ferrier's, who said she experienced before losing consciousness "a smell like that of green thunder."

In tumoral cases we also encounter aurae of sudden loss of vision or of hearing, where the explanation may lie in a negative visual or auditory hallucination. Stransky's symptom of *thought-echo, reading-echo,* or *Gedankenhören* belongs as a rule to the domain of psychiatric medicine, though it has been known to occur in patients with temporal lesions (Sanz; Klein). It may show itself as an auditory hallucination whereby the patient hears his own thoughts spoken aloud into his ear.

Among the more unusual visuo-hallucinatory phenomena which may accompany occipital lobe lesions we recall the *optical allaesthesia* of Herrmann and Pötzl. This symptom, which may also occur in cases of migraine, entails the illusory projection of real objects from one quadrant of the visual field into the diagonally opposite quadrant, in a hallucinatory fashion. This phenomenon, which has been termed the "fata morgana of the visual sphere," is well exemplified by the following case:

> The patient frequently saw his nurses, attendants, visitors, etc., who were actually by his bedside, inverted and appearing as though they were walking on the ceiling. This illusory state chiefly supervened towards night-time. Other disorders included spatial disorientation with regard to his body image, a right-sided paracentral scotoma, diplopia, and nystagmus. At necropsy a suppurating injury of the left occipital pole and cerebellar hemisphere was found.

It would be unwise to lean too heavily upon the occurrence and nature of hallucinations in localizing intracranial lesions. They may at times lead to errors in topographical diagnosis unless it is borne in mind that false localizing symptoms of a hallucinatory nature may be occasionally provoked (1) by compression of cerebral arteries against the edge of the tentorium, or (2) by simple internal hydrocephalus. Thus we may meet cases of hallucinosis in subtentorial as well as frontal lesions. We are reminded that in a personal account of the symptoms of a cerebellar haemangioblastoma made by the Hungarian novelist Karinthy, hallucinatory noises like "trams rattling in the street" occurred very early.

In a separate category belong those uncommon cases of "*peduncular hallucinosis*" described by Lhermitte. This syndrome comprises as a rule mild confusion and persistent visual hallucinations. These last are often of the Lilliputian variety, originally described by Leroy in toxic and senile states, and may consist in the appearance of little people or animals, often brightly coloured and in quick movement. The corresponding affect is usually one of interest, pleasure, and amusement, rather than distress or alarm. Although the original cases were associated with vascular lesions in the mesencephalon, the syndrome is more often seen in cases of pituitary or juxtapituitary tumours. It is perhaps significant how often blindness coexists.

Epilepsy

Hallucinations may occur as auditory, visual, or combined sensory aurae in cases of essential epilepsy. Visual aurae were found in 6.7 per cent. (Lennox and Cobb) and 15.9 per cent. (Gowers), compared with auditory warnings which occurred in 1.7 per cent. (Lennox and Cobb) and 6.2 per cent. (Gowers). There are far-going analogies with the conditions seen in tumour cases, though clinical evidence and eventual post-mortem verification may completely exclude gross macroscopic disease of any part of the cerebral cortex. The physician at the bedside, however, will be wise if he regards with suspicion every case of epilepsy where the aura is one of a visual or auditory hallucination and never dismisses the possibility of an intracranial growth.

Some neurologists consider that minor differences may occur between the characters of the aurae in "idiopathic" and "symptomatic" cases. Crude, simple, and unpleasing hallucinations of sight and hearing (as also of taste and smell) are thought to be more suggestive of tumour than are the complex formed hallucinations. According to Gowers, visual aurae in epileptics often comprise coloured photisms, which have the following order of frequency: red, blue, green, yellow, purple. This arrangement of colours corresponds roughly with the scale of luminosity.

There is also some connexion between cases of epilepsy with special sense aurae and the ability to precipitate a seizure at will by artificially reproducing the hallucination. There are a number of such instances of *reflex epilepsy* on record, a personal case of which, published elsewhere, may be quoted here:

> A woman of 40 was subject for many years to epileptic fits. Frequently an attack would be heralded by an aura of weird and unearthly music. Usually of a displeasing type, once or twice the music had been agreeable, though unreal. At times fits could be induced by extraneous factors, such as a sharp pinprick or, characteristically, by loud noises.

Holmes has also stated that soldiers with occipital injuries, and who were subject to focal epilepsy, used to develop an increased number of fits after their eyes had been strained in a cinema. Elsewhere I have mentioned the case of an epileptic boy whose fits were preceded by a visual aura. On several occasions an attack had been adduced by visual stimuli reminiscent of the aura (arc light, fireworks, sunlight through railings).

Hallucinations in Migraine

The characteristic teichopsia of a migrainous attack, with its scintillating, polychrome, zigzag, or fortification figures, is of course a phenomenon of hallucinatory character. Judgment as to frequency of this depends entirely upon a personal viewpoint as to what exactly constitutes an attack of migraine. For myself I would regard teichopsia as a relatively infrequent symptom. More elaborate visual phenomena are excessively rare. Optical allaesthesia, to which reference has already been made, can also precede attacks of migraine; and, indeed, we owe the original description of this visuo-psychic aberration to the autobiographical record of Dr. Beyer's migrainous attack. Some writers, notably C. Singer and R. H. Elliot, have chosen to ascribe the fantastic illustrations in the writings of the mystical Abbess Hildegard of Bingen to the operation of a severe migraine.

Auditory hallucinations do not ordinarily occur in migraine, and the presence of a pulsatile tinnitus during

an attack should at once arouse the suspicion of an underlying vascular anomaly of the brain—for example, angioma.

Hallucinations in Infective States

In pyrexial states, especially in alcoholic subjects, delirium is a common development with its attendant confusion, disorientation, and hallucinosis. It is perhaps less well known that in milder febrile illnesses, where the sensorium can in no way be regarded as clouded, isolated hallucinations of sight or of hearing may occur. These may be so clear, and so in conformity with the environment, as to arouse considerable credulity on the percipient's part. There is no background of confusion, and there is nothing bizarre or incongruous about the hallucinations. It seems more as though the slightly raised temperature produced a state of sensorial hyperaesthesia, rendering minor special sense stimuli perceptible though incorrectly interpreted.

Hallucinations in Organic Psychoses

Commonest among the psychoses which fall within the notice of the neurologist is general paralysis. Hallucinations, though not actually a frequent symptom, do nevertheless occur in a certain number of cases. There is a good deal of evidence to suggest that malarial therapy actually increases the tendency towards hallucinosis. Thus Zoltan v. Papp, in 1934, recorded them in 19.29 per cent. of his series of 428 cases of general paralysis of the insane, most of which had received fever therapy. W. Pires also noticed the development of hallucinations after malaria, and he regarded this not as a bad prognostic feature but as an indication of partial arrest though insufficient treatment.

In chronic epidemic encephalitis hallucinations are not rare. They may occur as recurrent manifestations in association with crises of respiratory dysrhythmia or of oculogyric spasm. More often they appear as an hypnagogic occurrence, linked up with one of the various post-encephalitic disorders of sleep (narcolepsy, hypersomnia, inverted sleep rhythm). According to K. Leonhard, there is a resemblance to the delirium of alcoholism in that the hallucinations may often be induced voluntarily or be suggested to the patient by fixating the visual or auditory attention.

Narcolepsy

It is not generally known that hallucinations are common symptoms in narcoleptics. Elsewhere I have described the various disturbances of nocturnal sleep which are characteristic of this disorder. The most striking of these disturbances is seen in hallucinations appearing when the victim awakes. Thus Brock's patient passed into a condition of *Wachanfall*, so that on coming round from a sleep attack he would be unable to move for a period of five to fifteen minutes ("*waking paralysis*"). During this state he would imagine he saw and heard around him various members of his family. Moyer's patient saw grotesque creatures approaching him with the onset of each sleep attack. Fischer described a narcoleptic patient who was subject to tactile and auditory hallucinations, both during the day and when in bed. One of Daniel's patients was liable to visual hallucinations while driving his car.

Hallucinations complicating what is probably hypnagogic cataplexy in narcoleptic subjects are exemplified by various case reports in the literature. Lhermitte wrote of this feature under the term "onirisme narcoleptique." The patient recorded by Serejski and Frumkin often saw round his bed women who tried to choke him. Other comparable cases have been mentioned by Nemlicher, by Alajouanine and Baruk, and also by Rosenthal. Daniel described three such patients:

(1) Shortly after retiring his legs and arms and then face felt helpless; a ghost-like figure would now appear. (2) Attacks of powerlessness on dropping off to sleep, associated with a spectral snake which he could see and feel coiling around the neck; or a bright-coloured parrot would be seen and heard abusing him. (3) Attacks of hypnagogic powerlessness coupled with hallucinations of people entering the room by way of the window. Various other complex hallucinations of a haptic nature also occurred.

One of my narcoleptic patients, who was able to give minute details of his predormital symptoms, said: "I seem to be aware that people are in the room. I seem to hear them moving about. I hear their voices; they usually make commonplace and not unexpected remarks, such as comments upon the untidiness of the room, etc. I can usually refer the voice to a particular person—for example, to my brother, or to my housekeeper, who is actually thousands of miles away."

Such predormital hallucinations are of course comparable with the more common hypnagogic feelings in narcoleptics of motor paralysis and psychical unrest, with illusions of people moving about the room although nothing abnormal is actually seen or heard. These hallucinatory states are perhaps also allied to the frequent occurrence in narcoleptics of very vivid and realistic dreams.

We must also recall that vesperal hallucinations are by no means uncommon occurrences in persons who are not narcoleptics, and who are apparently in perfect physical and mental health. These "*hypnagogic hallucinations*," as they are called, have been the subject of a good deal of attention, not only on the part of medical psychologists but also of laymen interested in the occult and the bizarre.* Francis Galton mentioned this phenomenon quite briefly in his account of "visionaries," and he referred to five eminent newspaper editors known to him as subjects of predormital or crepuscular hallucinosis. The problem is ably dealt with in Lhermitte's monograph on sleep. All sense organs can be involved, but chiefly those of hearing and of sight. In the former case, isolated words, snatches of a sentence, notes or even phrases of music, may obtrude upon the drowsy subject's consciousness. They differ from the impulsive thoughts of psychoneurotics in that the sounds are hallucinations and not images: they are not necessarily reiterative; and they cause no feeling of annoyance or alarm. Visual hypnagogic hallucinations are more common than auditory, and are usually elaborate. At times they consist in some intricate coloured pattern—stylized, geometric, crystalline. More often there appear visions of flowers, animals, objects, human beings, either in active movement or in repose. According to Delage these phantasms may be projected into the direction of the fixating gaze and may shift with the movements of the eyes; here we have evidence of a peripheral factor in the production of the hallucination. The visions usually appear abruptly, and

* This subject has often been ventilated in the lay press under such titles as "Faces in the Dark," "Visions," etc. Those interested may refer to the *St. James's Gazette*, February 10, 1882, and to the correspondence columns of *John o' London's Weekly*, November 22, December 6, 20, and 27, 1930. Various writings on psychical research dealing with phantasms, and hallucinations in general, also refer to this problem briefly. (Vide *Proc. Soc. Psych. Res.*, **1**, 102, and **3**, 171; F. Podmore, *Apparitions and Thought Transference*, 1894; E. Gurney, F. W. H. Myers, and F. Podmore, *Phantasms of the Living*, 1886—two vols.)

are independent of any volitional or affective factors. Indeed, a willed effort to modify the visions usually results in nothing but their disappearance, acting in the same way as an interrupting auditory stimulus. As a rule the feeling-tone is one of interest or curiosity, though in young children there may be intense alarm.

Hallucinations in Drug Intoxications

There are a large number of substances, differing widely in chemical composition, which are capable of producing states of hallucinosis. We must of course distinguish between the effects of a single large dose of a deliriant drug—where the psychosis will resemble a febrile delirium—and the states of chronic intoxication, where consciousness remains intact and delusional ideas and illusory phenomena are associated. Although there is a certain uniformity about the symptoms of the acute deliria, the chronic drug psychoses differ a good deal one from the other. Mixed drug addictions are of course extremely common and render the resulting psychosis difficult to analyse.

According to Kraepelin's classical work there are certain features common to all cases of acute drug hallucinosis: (1) rapid, even abrupt onset; (2) dulled consciousness, associated with lively hallucinations, chiefly visual and auditory; (3) mild disorientation; (4) occasional delusional ideas, which are only exceptionally acted upon; (5) a feeling-tone sometimes of indifference, but more often of anxiety or alarm; (6) zoopsia, or hallucinations of animals; ideas of numerous small objects—threads, flock, dust; tactile micro-hallucinations, comprising feelings of being sprayed, stabbed, electrocuted, or woven in; (7) visual hallucinations which come and go, and change in form, in a kaleidoscopic fashion; (8) a general mood which is chiefly one of anxiety, less commonly elation—sometimes there is an impulsive restlessness; (9) such physical manifestations as loss of weight, unsteadiness, ataxia, defective speech, sweating; (10) not rarely, local or general fits; (11) exaggeration of the tendon reflexes, the pupils being sluggish in reaction and abnormal in size; (12) frequent fever and tachycardia, associated with albuminuria; (13) a short duration, usually less than fourteen days, the outcome being generally favourable.

Kraepelin differentiates between hallucinations and delirium; he draws many clinical points of distinction, chief among them being the clouding of consciousness in the delirious states. The same author considers that the exogenous poison in question is not directly responsible for the symptoms, but that "metatoxic" by-products are the immediate factors. He discusses the view that alcohol may be at the bottom of every drug intoxication; certainly alcohol appears to increase susceptibility to all other poisons. He also believes that there is no real distinction between the withdrawal psychosis and the drug psychosis—in the case of many toxic substances, at any rate.

The chemical substances which may be directly or indirectly responsible for the production of visual or auditory hallucinations are very diverse. Kraepelin discussed such well-known poisons as alcohol, chloroform, benzene, paraldehyde, chloral; carbon disulphide; morphine, cocaine; phanodorm, veronal, belladonna, salicylic acid, adalin. We may perhaps consider quite briefly a few other well-known deliriants—namely, the bromides, cannabis indica, mescal, ayahusca, yagé, and agaric.

Bromide intoxication has been recognized as a not uncommon occurrence only within the past seven or eight years. Certainly it may be responsible for the development of various bodily and mental symptoms in patients who have been under prolonged treatment with nerve sedatives. Confusion, or even stupor, may develop. There may be mental excitement with confabulation, or at times depression. Tremor of the limbs, dysarthria, diplopia, sluggishness of the reflexes, are among the neurological features. Hallucinations, especially of hearing and of sight, very commonly occur. As in so many of these drug intoxications, the visual hallucinations often comprise Lilliputian phantasmagoria, with swarms of little animals or people, grotesque and many-coloured, in constant movement and transformation.

Cannabis indica, an excellent account of the effects of which has lately been given by P. B. Wilkinson, produces a feeling of hilarious intoxication, often followed by depersonalization and vivid hallucinations. These vary in complexity, but are frequently grotesque and kaleidoscopic. Both Gautier and Baudelaire have described in powerful language the elaborate visual, auditory, and tactile hallucinations, with illusory distortions and hypersensitivity, often accompanied by the most intricate synaesthetic phenomena. According to Gautier:

"My hearing was enormously increased; I heard the noise of colours. Green, red, blue, and yellow sounds reached me quite distinctly in waves. A glass knocked over, the creaking of an armchair, a whispered word, vibrated and re-echoed in me like a peal of thunder; my own voice seemed to me so loud that I dared not speak for fear of knocking the walls down or making myself explode like a bomb. More than five hundred clocks sang the time to me in silvery flute-like voices. Everything I touched gave forth the note of a lyre or an Aeolian harp. I was swimming in a sea of sound in which certain motifs from *Lucia* or the *Barber of Seville* floated like islands of light. Sounds, scents, and lights came to me through innumerable pipes, thin as hairs, in which I could hear magnetic currents whistling. As far as I could determine, that state lasted about three hundred years. When the attack was over I saw that it had lasted a quarter of an hour." His visual hallucinations included the flight of a myriad butterflies whose wings he could hear; hideous and protean fabulous monsters. In another place Gautier writes: "... a complete transposition of my sense of taste. The water I drank seemed to me to possess the flavour of the most exquisite wine, the meat changed in my mouth into raspberries, and vice versa. I could not distinguish a cutlet from a peach. My neighbours began to look a little strange ... their noses grew into proboscides; their mouths opened like a bell. Their faces took on supernatural tints. ... A dull warmth ran through my limbs. ... Hallucination, that strange host, had installed itself with me." Later: "A red light passed under my eyelids, a countless number of candles lit themselves and I felt myself bathed in a pale luke-warm light ... everything was bigger, richer, more splendid. Reality served only as a focus for the magnificence of the hallucination. ... I heard the rustling of materials, the creaking of shoes, voices which whispered, murmured, and lisped; bursts of stifled laughter, noises of the legs of the table or armchairs. The china was being rattled; doors were opened and shut ... suddenly a mysterious figure appeared. How had he gained admission? I do not know. His appearance did not alarm me; his nose was hooked like the beak of a bird, his green eyes were encircled with three brown rings and he wiped them constantly with his enormous handkerchief; a high white starched cravat into the knot of which had been passed a visiting-card ... choked his thin gullet, and threw into pink folds the skin of his neck; a black coat with square tails, from which hung a bunch of charms, emprisoned his convex body like a pouter pigeon. As for his legs, I could swear they were made of mandragora roots, bifurcated, black, wrinkled, full of knots and warts which looked as though they had been pulled up quite recently, for particles of earth still adhered to their filaments. These limbs wriggled and

twisted with an amazing agility, and when the little torso which they supported confronted me this strange being burst into sobs, and wiped his eyes upon each sleeve in turn."

Mescal is of course well known as the most powerful excitant of visual hallucinations, and the literature of the past decade contains a great deal of information on the subject. The effects are not unlike those of cannabis indica, though differing in the rarity of auditory hallucinations. I may perhaps be permitted to quote from an earlier paper of mine in which I described the hallucinations produced by personal experimentation, in association with a colleague:

"On the horizon, a setting sun, lighting up the landscape with a dark red glow. The radiations from the sun are a beautiful combination of red and black. In the foreground are several dark figures which might be camel riders or trees. . . . A thing like an aeroplane with a long yellow body and blue wings. Almost at once it changes so that it is obvious that the centre is really a broad pathway leading up to a high palace. The sides of the path are light blue and consist of shrubs. The pathway itself is most beautiful . . . steps are visible at the end of the path. Now the sides are changing into a gorgeous flower-bed, the predominant colours in which are white and red . . . the whole effect is most beautiful . . . the picture is now rapidly changing and has now become a bowl of heather mixed with tiger-lilies." Later still: " . . . yellow specks dotted upon a black background . . . they are becoming larger and more numerous, and are forming a pattern. Red is now the most prominent colour: the arrangement is like a carpet, consisting in concentric rectangles, dark red, salmon pink, blue, golden, and so on. Larger white specks dart rapidly in from the periphery on to the carpet, like bright silver coins pouring into the centre—or like white streaks of lightning. Everything is now moving; the carpet design is breaking up and gives place to a mass of bright spangles dancing rapidly all over the picture."

As Klüver has pointed out, in the hallucinations certain form-constants tend to appear over and over again. The visions are always multi-coloured and luminous. They are frequently changing but often incomplete. Almost always are they described as beautiful (*kalopsia*). The emotions provoked are those of interest, amusement, and delight. Depersonalization and disorientation are characteristic. Illusory changes in the appearance of surrounding objects are often conspicuous. The faculties of other special senses may be perverted or, more often, enhanced. This is illustrated in D. H. Lawrence's description:

"So distinctly she heard the yapping of tiny dogs, the shuffle of far-off feet, the murmur of voices, so keenly she detected the smell of smoke and flowers and evening falling, so vividly she saw the one bright star infinitely remote stirring above the sunset, that she felt as if all her senses were diffused on the air, that she could distinguish the sound of evening flowers unfolding and the actual crystal sound of the heavens as the vast belts of the world atmosphere slid past one another, and as if the moisture ascending and the moisture descending in the air resounded like some harp in the cosmos."

In studying the effects of cannabis indica and of mescal we are reminded of de Quincey's autobiographical account of the dreams which attended his opium intoxication. One knows that it is rare for that drug alone to produce so vivid a delirium, and it is a moot point whether one is recording realistic mental images or actual hallucinations. Thus as we turn the pages of de Quincey we find:

"Often I used to see a crowd of ladies, and perhaps a festival of dances. . . . This pageant would suddenly dissolve; and at a clapping of hands would be heard the heart-shaking sound of *Consul romanus*: and immediately came 'sweeping by' in gorgeous paludaments, Paullus or Marius, girt round by a company of centurions, with the crimson tunic hoisted on a spear. . . . To my architecture succeeded dreams of lakes and silvery expanses of water; . . . the water gradually changed their character—from translucent lakes, shining like mirrors, they became seas and oceans." Later in his diary we read: "*May, 1818*: . . . every night . . . I have been transported into Asiatic scenery . . . under the connecting feeling of tropical heat and vertical sunlights, I brought together all creatures, birds, beasts, reptiles, all trees and plants, usages and appearances, that are found in tropical regions, and assembled them together in China or Hindostan. From kindred feelings, I soon brought Egypt and her gods under the same law. I was stared at, hooted at, grinned at, chattered at, by monkeys, by paroquets, by cockatoos. I ran into pagodas, and was fixed for centuries at the summit, or in secret rooms; I was the idol; I was the priest; I was worshipped; I was sacrificed. I fled from the wrath of Brama through all the forests of Asia; Vishnu hated me; Seeva lay in wait for me. I came suddenly upon Isis and Osiris; I had done a deed, they said, which the ibis and the crocodile trembled at. Thousands of years I lived and was buried in stone coffins, with mummies and sphinxes, in narrow chambers at the heart of eternal pyramids. I was kissed, with cancerous kisses, by crocodiles, and was laid, confounded with all unutterable abortions, amongst reeds and Nilotic mud."*

Ayahuasca (*Banisteria caapi*) is a little-known drug, being a plant sacred to the dwellers of the Brazilian forests. We have been reminded within recent years of this drug through the employment of "harmine" in states of Parkinsonism, this alkaloid being chemically identical with the active principle of ayahuasca. The clinical effects of the drug are demonstrated in the descriptions in the religious orgies. A preliminary stage of excitement and erotism is followed by vertigo and simple visual hallucinations. Then appears delirious excitement in which the victim rushes here and there uttering piercing cries. Formed hallucinations of vision now occur—"beautiful landscapes, cities, towers, animals . . . shining circles of light, many-coloured butterflies" (Critchley).

Yagé is a climbing plant of similar geographical distribution. It is not yet employed in orthodox medicine, but locally it is used as an intoxicant, and also as a remedy for beriberi. Here, too, visual hallucinations are conspicuous. "Blue splashes before the eyes," succeeded by malaise, vertigo, euphoria, and confusion, are in turn followed by vivid and extraordinary visions. According to Bayon, "I saw an enormous green serpent in threatening attitude, then thickets, rivers, cascades, birds, savage beasts, immense swamps. . . . I was changed into a giant, my head was above the highest buildings and I looked down upon the crowd of pygmies. Then little men and women came and danced about in the dark. . . . I was being chased by a little figure with an enormous head." Of chief interest, however, is the alleged metagnomigenic or clairvoyant virtues of the plant, which lead the devotees to take it on important occasions, as, for example, when they wish to learn the whereabouts of their enemy, the location of ambushes, the approach of strangers, propitious hunting areas, or the most suitable partner in marriage. To test the thaumaturgic action of this drug a Portuguese soldier, Colonel Moralès, was persuaded to experiment on himself. After taking sixteen drops he dreamed that his father was dead and his sister ill. This proved to be actually the case. Other instances are recorded of veridical dreams or hallucinations due to the influence of this drug (Critchley).

* We are reminded also of the Journal of Jean Cocteau and his fantastic designs, inspired under the influence of opium, by the recollection of some sleeping dream or waking hallucination. We also recall Gautier's *Pipe d'Opium*, wherein he describes the fantastic dreams induced by this drug. Farrère's *Fumée d'Opium* probably belongs more to the realm of the imagination, but is none the less of interest to medical readers.

Mushroom poisoning, or "mycetism," is another occasional cause of hallucinations (Critchley). For years a variety of mushroom called the *Agaricus muscarius* has been taken by the inhabitants of Siberia as an intoxicant. The effects of this "fly-agaric inebriety," as it is called, appear within an hour or two. Twitching or trembling of the limbs is followed by a sense of exhilaration, leading to a condition of delirious excitement. During this stage auditory and visual hallucinations develop, while enlargement of the pupils produces macropsia. The subject in his frenzy may rush round until he collapses into a state of exhaustion coloured by strangely pleasurable fantasies. Lewin believes that the fury of the old-time Berserkers may have been due to agaric intoxication. The Siberians have discovered that the urine of a person inebriated by agaric also possesses intoxicating properties. As soon as the reveller finds that his drunkenness is passing off he drinks his own urine or that of another.

Summary

A description is given of hallucinations occurring in the course of various neurological disorders.

Hallucinosis associated with narcolepsy is also considered, and reference is made to the occurrence of hypnagogic hallucinations in "normal" persons.

Drug intoxications are then dealt with, distinction being made between acute delirium after poisoning from a single massive dose and states of chronic intoxication.

Kraepelin's views regarding the clinical characteristics of drug deliria are given. Finally the phenomena associated with intoxication with mescal, cannabis indica, bromides, agaric, yagé, and ayahuasca are briefly described.

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Gonococcal Carriers.—The types of "carrier" are described. The author regards as the true carrier one who harbours the organism in recoverable form, who can infect others with clinical gonorrhoea, and yet at no time has symptoms and signs of the disease. Such cases are rare but perhaps occur more often than is generally thought. In such cases the organism can be found for a limited period only, and before it can be regarded as a gonococcus it must show the usual cultural characteristics, including the characteristic sugar fermentation reaction.—Carrier Problem in Gonorrhoea. W. Burger.—*Arch. Derm. Syph., Wien.* March, 1939, **178**, 562.

PUERPERAL SEPSIS AND HAEMOLYTIC STREPTOCOCCI

BY

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In 1932 the results of a study of 4,655 deaths directly attributed to childbirth in this country showed that 38 per cent. were due to puerperal sepsis. Almost half (46 per cent.) of these deaths from sepsis followed normal deliveries. In other words, infection following normal labour caused 18 per cent. of all deaths in this series. It was estimated that not less than 85 per cent. of these fatal infections following normal labour were due to haemolytic streptococci. These organisms were also responsible for a somewhat less but variable percentage of infections following instrumental or difficult labour. In view of this evidence the importance of the study of haemolytic streptococci needs no emphasis for those interested in the reduction of maternal mortality.

As a result of recent research it has become possible to differentiate between various types of haemolytic streptococci. By means of a precipitin test, Lancefield (1933) divided haemolytic streptococci into several groups designated at first A, B, C, D, and E, further groups being added later. Strains from various human infections were found almost invariably to belong to Group A; Lancefield and Hare (1935) showed later that almost all the infecting strains in a series of cases of severe puerperal sepsis belonged to Group A. They found also that Group A streptococci were extremely rare in the genital tract of women with afebrile puerperia or with minor puerperal infections.

In organizing our attack on puerperal sepsis as a contributory factor in maternal mortality, emphasis has to be laid upon two facts: (1) Since almost half of the deaths from sepsis follow normal labour, it is clear that more must be done than can be effected by improving ante-natal treatment or by increasing the amount of dexterity or judgment exercised in operative obstetrics. (2) Since evidence is accumulating that the upper respiratory tract of the patient herself (or more often that of her contacts) is the most probable source of puerperal infection with haemolytic streptococci, attention must be directed to possible methods of preventing the transfer of organisms from these sites to the genital tract immediately before, during, and after childbirth. The following report of an investigation in a consecutive series of 120 students examined during the last two years contributes data on the incidence of Group A haemolytic streptococci in women of college age.

In 1936 it was decided to take a swab from the throats of all medical students before they began their work in the maternity wards of the obstetrical and gynaecological unit of the Royal Free Hospital, London. In each case the throat swab was taken about three weeks before the student was due to come into residence in the hospital for her two and a half months' training. If a growth of streptococci was found, McLeod's test was carried out to see if it showed soluble haemolysin, and, if it did, the Lancefield group to which the haemolytic streptococci belonged was ascertained by the precipitin reaction.

Incidence of Haemolytic Streptococci

In 22.5 per cent. of cases a growth of haemolytic streptococci was obtained. This carrier rate of haemolytic

streptococci seems slightly higher than the average incidence in temperate climates as worked out by Hare (1935), Walker (1920, 1921), Tongs (1919), Bourn, Carpenter, and McComb (1933), Topley and Wilson (1936), and White (1935). It is worthy of note that one-third of these students were at work in children's wards. The exceedingly high incidence of haemolytic streptococci in the throats of children in hospital is well established by Pilot and Davis (1919), Blanton, Burhans, and Hunter (1919), Pilot and Tumpeer (1926), and Burpee (1937). In 6 per cent. of the students the haemolytic streptococci were reported to belong to Lancefield Group G.

Incidence of Group A

Only in five out of the 120 students examined—that is, in 4.2 per cent.—did the haemolytic streptococcus belong to the Lancefield Group A. (This carrier rate is below that judged by Hare to be the rate for the adult population—namely, about 7 per cent.).

About a year ago Frisch (1938) published the results of a study of the carrier rate in a group of 621 men and women students. One interesting finding was that, although the carrier rate of the whole group was 6.4 per cent., that for the 152 women included in the series was only 1.9 per cent. (The proportion, if any, of these who were students of medicine was, however, not stated.)

The present small series, spread over two years, gave no evidence of any seasonal variation in the frequency of the carrier rate of all haemolytic streptococci or of Lancefield Group A. This finding fits in with the diversity of the distribution throughout the months of the year of the maximum carrier rate of haemolytic streptococci reported by Burpee (1937), Meleney (1927), and Burgin and Higgins (1934).

Throat Conditions and Group A Haemolytic Streptococci

We may next consider whether there was any relation between the condition of the throat and the incidence of haemolytic streptococci, Group A.

Students with Positive Initial Throat Swabs.—Only in two of the five students had tonsillectomy been performed (in one case in childhood and in the other two months before the swab was taken). In a third tonsillectomy had been performed, but two small patches of granulation tissue were present in the tonsillar beds, and these required early treatment by diathermy. In the remaining two students the tonsils were enlarged to some degree, and in both there was evidence of sepsis. The antra and sinuses were, however, reported to be in a satisfactory condition.

Students with Negative Initial Throat Swabs.—Two students in whose throats no haemolytic streptococci were found at their routine throat examination developed sore throats during their training, and Lancefield Group A streptococci were then grown from their swabs. Neither gave a history of frequent sore throats (one was tonsillectomized and the other was not). A third had a history of sinusitis which had been treated by lavage for one year, with consequent great decrease in the frequency of the complaint of sore throat. The right tonsil was enlarged. The presence of Lancefield Group A haemolytic streptococci was discovered because she was in contact with a case of puerperal sepsis.

There is therefore no evidence of any relation between the incidence in the throat of haemolytic streptococci belonging to Group A and the presence of tonsillar tissue. Complete tonsillectomy had been performed in about 50 per cent. of all the students. Haemolytic streptococci were absent in as large a proportion of students with tonsils or remnants of tonsils as of those in whom complete tonsillectomy had been performed.

Treatment of the Haemolytic Streptococci Group A Carriers

Each student was given leave of absence, and more emphasis was laid on moderate exercise in the open air than on painting or gargling of the throat (though this was done in four cases) or on the administration of prontosil or proseptasine (which was done in three cases). Whenever it ceased to be possible to grow Group A streptococci from their throat swabs the students were considered fit to begin obstetric work. The time required for treatment varied, but the persistence of the positive throat swab was most noticeable in those students whose nasopharynx was in an unsatisfactory condition. Students were not re-examined after return to work unless they were known to have been in contact with a possible source of infection, such as scarlet fever in a district home or a case of possible puerperal sepsis, or unless they developed catarrh of the upper air passages.

Medical Work Previous to Obstetrics

This series of 120 students may be taken to represent a group of healthy women between 20 and 30 years of age. It is of interest to ascertain the nature of the medical work which the five students were doing in whose throats Group A haemolytic streptococci were found at the initial test. One out of the five was taking classes in a hospital for infectious diseases, in radiography, orthopaedic surgery, psychological medicine, and physical medicine, but this work was also being done by 16 per cent. of the total group of students. Four out of the five were working in the children's ward at the time that the Group A streptococci were found. This is worthy of comparison with the fact reported above that one-third of the students in whose throats haemolytic streptococci of some type were found were at work in the children's ward. The students' curriculum, however, was so arranged that as many as 39 per cent. of the whole group were also being taught in the sick children's wards immediately before their training in the obstetrical wards.

The groups of students none of whom had haemolytic streptococci Group A in their throats were found to be working at the following subjects in order of frequency: diseases of ear, nose, and throat, diseases of the chest with senior pathology, medicine, casualty, cancer, gynaecology, and venereal diseases.

While the number of cases in the series is too small to justify categorical assertions, there seems ground for the suggestion that the curriculum of medical students should be so arranged that work in the children's wards should not immediately precede or be contemporary with work in obstetrics unless special steps are taken to control the carrier rate in the children's wards. Those in contact with respiratory ailments should exercise particular care, with the knowledge that their own susceptibility to act as carriers of Group A haemolytic streptococci may be an important factor in the transmission of the infecting organism of puerperal fever.

Group A Haemolytic Streptococci and Subsequent Enforced Absence

The relation between the incidence of failure to remain continuously at work during the ensuing months of obstetric training and the initial finding of Group A haemolytic streptococci is of interest. Only two of the five students were off work for a few days, at the end of their second and third months respectively, but in the

throat of one only of these were haemolytic streptococci Group A again found.

In order to judge the significance of this occurrence—namely, that two of the five students who originally had Group A haemolytic streptococci in their throats were later absent on account of catarrh—it is essential to consider the frequency of illness in the whole group of 120 students.

Only 9 per cent. of the students were imperfect in their attendance at work on account of slight illness, and 7.5 per cent. of the total group had catarrh severe enough to lead to cessation of duty. An interesting finding is that 44 per cent. of these students did not have Group A haemolytic streptococci demonstrated in their throat swabs either before or during the attack of catarrh. Of the remaining students 60 per cent. had Group A streptococci during the attack of catarrh, although they had had none in their throats before starting their work in obstetrics. In 20 per cent., though Group A streptococci were demonstrated at the original examination, none were found in the throat during the attack of catarrh. The remaining 20 per cent. had the Group A streptococcus demonstrated before and on several occasions throughout their training. Two students were put off duty because they had been in contact with a patient in whom Group A haemolytic streptococci had been found, and haemolytic streptococci were demonstrated in their throats, but in only one of the students did these prove to belong to Group A.

Puerperal Pyrexia and Patients' Throats

It may be of interest to record that only on four occasions during these two years, when throat swabs were examined because a patient had developed puerperal pyrexia, were haemolytic streptococci found in the patient's throat, and in two cases these did not belong to Group A, B, C, or G; in one they belonged to Group B and in one to Group A. In this latter case the same strain of haemolytic streptococcus was isolated from the patient's cervix and also from the throats of a student and a nurse in contact. Only in one of the other cases was a student found to be a carrier.

Conclusions

As many as five carriers of Group A haemolytic streptococci were found in a group of 120 apparently healthy women of college age.

The importance of these findings appears to lie in the suggestion that greater facilities for the routine examination of throat swabs should be made available to the medical and nursing profession.

It would seem advisable, also, that the students' curriculum should be so arranged that under present conditions contact with children's diseases should not be made immediately before work in obstetrical wards, nor should it be made contemporaneous with such work.

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OPHTHALMIC SERVICES TO THE CIVIL POPULATION IN NATIONAL EMERGENCY*

BY

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Modern warfare carries the evil promise of two new principles—the terrorization of the civil population and the "Blitzkrieg"—the lightning war. The organization of the medical services to the civil population has thus passed beyond an errand of mercy into a primary weapon of defence, for a successful attempt on the morale of the civil population would inevitably be a major disaster. The role of organized medicine in any future war will therefore be of a different character from that in the past. In the Boer War there were more casualties from epidemics among the troops than from actual war injuries; in the great war medicine served in the dual function of tending the wounded and evolving a public health system which prevented the spread of epidemics, though not altogether successfully, as the influenza pandemic of 1918 showed. In a future war medicine will have to face the task of tending to a new type of casualty: civilians subjected to all the rigours of hostilities, for each individual home will be part of the battlefield.

To the established duties of military medicine in tending the maimed in the armed forces and maintaining public health services as a safeguard against epidemics in the civilian and military populations will thus be added the new obligation of evolving an organization to deal with civilian casualties. This situation is new in yet another sense, for the weapons of attack on the civil population are as yet largely untried and their potentialities are not fully known. In this welter of uncertainty one thing stands out: contrary to past experience, the first duties of medicine will not be on some limited battlefield amid the clash of armed forces but among the civil population, against whom the concentrated fury of modern agents of destruction will be unleashed. As the limitations of aerial warfare are still undetermined, and as the technique of the "Blitzkrieg" tactics involves the maximum possible damage to be inflicted at the very beginning, it is likely that every possible means of destruction will be used experimentally—poison gas and incendiary bombs, which are probably relatively inefficient weapons, no less than the various types of heavy explosives. Every possible kind of injury is thus to be expected. More stable conditions are likely as the momentum of the "Blitzkrieg"

* Read in opening a discussion in the Section of Ophthalmology at the Annual Meeting of the British Medical Association, Aberdeen, 1939.

slackens, as inevitably it must from the terrific losses that will be suffered by the attackers and from the growing necessity of greater economy in effort. The intensive and "experimental" period will probably be short, but the most strenuous medical organization for this period is a vital necessity. Foresight, forewarning, and forearming are essential in facing the lurking unknown terrors. If the anti-aircraft gun is the first line of defence in A.R.P., the casualty station is the last, and the last line must be impregnable.

The General Casualty Service

The first essential is a service to collect the injured. So far as London is concerned, provision is being made for mobile units devoted to this task. These mobile units, in their ambulances, should be able to provide essential first aid and to take the injured to first-aid posts and to casualty stations, serving as temporary reception centres for base hospitals situated in the outlying areas. As injuries are likely to be multiple, the call for specialized services will probably be less urgent than for all-round competence—at any rate, for the personnel of the casualty stations. In the base hospitals a greater specialization will be possible and desirable.

Civilian Ophthalmic Patients

In any intensive and persistent bombardment much of the ordinary ophthalmic practice will cease automatically. The "chronics," the refraction patients, and the many patients with minor eye trouble are not likely to press for attention. The emergency acute glaucoma or other acute conditions of civil life will still require treatment. In London it is not anticipated that the eye hospitals will function fully, if only because the staffs will not be available for routine work, and it is probable that no new patients will be admitted. The patients with civilian emergency will, however, have access to the general hospitals, which will function as casualty clearing stations and should have some specialized talent. The civilian emergency will be dealt with in the same way as the victim of bombing, and where necessary he will be transferred to the base hospital.

Ophthalmic Air Raid Emergencies

Injuries confined to the eye are likely to be rare. Heavy explosives tend to kill or produce severe multiple wounds. During the last war, when fifty tons of high-explosive bombs were dropped on London in the air raids carried out between September, 1917, and May, 1918, out of the 1,415 casualties there were 435 deaths—that is, approximately one killed to two wounded. Recent experience in China and in Spain was on similar lines. In Barcelona during March, 1938, in successive raids over a period lasting three days there were approximately 1,000 killed and 3,000 wounded, and but very few slightly wounded. Of those trapped in collapsing buildings 10 per cent. died in spite of treatment, the mortality rate rising to 35 per cent. if those brought in dead at the hospital are included. Shrapnel wounds were even more serious: 25 per cent. of patients with traumatic amputations and 68 per cent. of patients with chest wounds died; the mortality among patients with compound fractures was 15.6 per cent., and among those with abdominal injuries requiring operation, 60 per cent. The general mortality of wounded admitted alive to all hospitals in Barcelona, taking together all lesions, from the slightest to the most serious, was 20 per cent. The total mortality was about 45 per cent. if those killed outright are included.

Ocular Injuries from "Gas"

So far as ocular injuries are concerned mustard gas and the allied lewisite are the only significant agents of chemical warfare. The lacrimators, of which chlorine gas is the classical example, result in nothing beyond alarming symptoms unless the eyes are splashed directly by the fluid which liberates the gas, when a corrosive burn is produced. The sensory irritants such as the arsenical compounds, and the asphyxiant gases such as phosgene, produce a transient conjunctivitis. In all cases, the rare direct corrosive burns from fluid lacrimators excepted, no treatment is necessary other than perhaps simple lavage.

The injuries produced by mustard gas during the Great War were chiefly of a minor and transient character. Approximately 75 per cent. of cases showed a mild conjunctivitis with no apparent damage to the cornea: in some 15 per cent. the conjunctivitis was more intense, and in the remaining 10 per cent. there was a corneal lesion. As the effect of mustard gas depends on the concentration that reaches the eye, and as the methods of distribution of the gas have been improved, the proportion of severe to mild injuries is likely to be higher in future.

In its gaseous or liquid state mustard gas is almost odourless, colourless, and devoid of any immediate irritant effect, except when the liquid is splashed into the eye. The immediate effect and the late results are therefore different, yet the action of this agent is instantaneous. If drops of liquid mustard gas are put on both corneas of an animal, and one eye is immediately thoroughly irrigated, the lesions in the two eyes on the following day are identical. Histologically, all the layers of the cornea are involved, and in severe cases the whole of the cornea is necrosed, exposing Bowman's membrane.

Mustard Gas Vapour.—After a latent period, which varies with the concentration of the vapour reaching the eyes—it was six to eight hours in the last war—pain and a feeling of grittiness under the lids develop, followed by photophobia, blepharospasm, and profuse lacrimation. The lids become oedematous and glued together. The conjunctiva, particularly in the interpalpebral area, is intensely engorged and swollen. Where the cornea is involved the photophobia and blepharospasm are more severe, and the patient may be unable to open his eyes, this leading to the fear that he has lost his sight. Though lacrimation is profuse there is no purulent discharge unless there is secondary infection. Where corneal involvement is present, that part of the cornea which is covered by the upper lid is generally unaffected. The exposed interpalpebral area loses its lustre; a turbid horizontal band is thus seen stretching across the clear cornea, to become confluent with the affected interpalpebral conjunctiva. The pupil is contracted. Abrasion, ulceration, and secondary infection may all occur, rendering the immediate prognosis more grave.

Mustard Gas Liquid.—Symptoms develop immediately. Within a few minutes there is intense lacrimation; marked injection of the conjunctiva occurs within half an hour, and progressive chemosis within an hour. Infiltrating ulceration involving the cornea, conjunctiva, and lids develops. The corneal lesion is similar to that of any severe caustic burn.

Treatment.—As the effect of mustard gas is instantaneous nothing can be done to counteract the damage from exposure to gas or liquid. Treatment therefore aims at the relief of symptoms, the control of the lesion, and the prevention of secondary infection and of complica-

tions. As an "anxiety state" from the fear of blindness arising out of the inability to open the eyes is a prominent feature, the patient has to be reassured about his sight by the simple procedure of gently separating his lids to convince him of his ability to see. Symptomatic treatment of conjunctivitis from vapour gas consists of irrigation with some bland lotion, such as sodium bicarbonate solution (ten grains to the ounce). Castor-oil drops or liquid paraffin drops may be helpful. Where the cornea is involved atropine drops, 1 per cent., should be instilled three times daily. A loosely fitting shade made of cardboard is useful, as are dark glasses, but the tight-fitting cellulose shades of commerce should not be used. On no account must the eyes be bandaged, for any persistent vapour is thus kept shut in and irritating discharge is pent up. Where secondary infection has occurred the usual treatment for acute conjunctivitis has to be carried out. The presence of corneal abrasion, corneal ulceration, and their complications calls for the special measures employed for these lesions in civil life.

Late Complications.—Recurrent corneal ulceration, coming on many years after mustard-gas conjunctivitis, makes the ultimate prognosis less satisfactory than is suggested by the immediate good result in many cases.

Ocular Injuries from Incendiary Bombs

Burns of the eye apart from general burns are unlikely. The lids may be involved in a facial burn, and the danger to the eye lies in remote sequelae rather than in immediate complications. Flying cinders may, however, cause a burn of the cornea.

Treatment.—Burns of the lids should be treated on general principles. The conjunctival sac should be irrigated. Reactionary chemosis of the conjunctiva requires fomentations or dry heat. Where corneal complications threaten or are present from exposure of the cornea, atropine should be instilled. A burn of the conjunctiva calls for special care to avoid shrinking and symblepharon. Gutt. ol. ricini and the frequent use of a glass rod to break down fresh adhesion are necessary.

Ocular Injuries from Explosives

Bullet wounds are less likely than wounds from flying shrapnel from bombs and anti-aircraft weapons. Immediate and remote effects of contusion injuries can generally be dealt with at leisure. The most common source of isolated eye injury is falling debris from collapsing houses. During the last war eyelid injuries were frequent, and were almost always accompanied by injuries of the eyeball. The lids became very oedematous and swollen, and it was found best not to put in sutures. Injuries to the globe were generally extensive, leading to the complete destruction of the eye—the sclera being torn to ribbons. There was usually profuse intra-orbital haemorrhage producing proptosis, and the tissues usually became oedematous and septic. As between the danger of meningitis from the removal of the eye in the presence of orbital sepsis and sympathetic ophthalmitis from delay in removing a dangerous eye, a cautious course had to be steered. The precaution of leaving a portion of the sclerotic around the optic nerve and thus avoiding opening the nerve sheaths was a helpful procedure.

Perforating wounds without immediate disorganization of the globe—other than those causing no more damage than prolapse of iris—carried a poor prognosis, even when a retained intra-ocular foreign body proved to be magnetic and was extracted. Occasionally a mark suggesting perforating wounds was seen on the cornea, and radiography failed to reveal any retained foreign body; such injuries were probably produced by grains of sand.

Treatment.—Probing of the orbit should be avoided for fear of carrying sepsis into the tissues, a particularly dangerous procedure if the injury to the orbit has opened the cranial cavity. Where a disorganized eye has to be removed, evisceration, leaving a stump of sclera, rather than excision, should be undertaken. In the presence of sepsis a drainage tube should be left in. Perforating wounds of the cornea with prolapse of the iris are treated in the same way as these injuries are dealt with in civil life.

Organization of a Treatment Service in Emergency

The special difficulties that will arise in the treatment of eye injuries in emergency lie in the great number of casualties that are to be expected, the improvised nature of many of the facilities that will be available, and the disorganization of the established ophthalmic services at the height of the emergency. First aid in eye injuries is of less importance than first aid given as a life-saving measure, so that first-aid parties and ambulance teams are unlikely to be able to render aid for eye injuries. The first-aid post and the casualty clearing station should, however, be equipped to deal with this. In case of gas injuries general decontamination will of course require attention. So far as the eyes are concerned, it should be unnecessary to do anything to patients who have worn suitable masks. Where a gas burn is suspected—and a vapour burn will not show itself symptomatically or objectively until after several hours—nothing beyond irrigation with bicarbonate lotion need be carried out, if at all. In an eye burn from liquid mustard gas the immediate and urgent symptoms call for attention. Irrigation with bicarbonate lotion and the instillation of atropine drops and gutt. ol. ricini should be carried out, and the patient supplied with a loosely fitting double shade. The danger of bandaging the eyes should be impressed upon the staff. All cases of eye burns, even those in which the cornea is apparently not involved, should be transferred to the base hospital.

Burns from incendiary bombs are unlikely to call for special eye treatment. Irrigation of the conjunctival sac by a bland lotion may occasionally be necessary. Where the cornea is involved atropine should be instilled at the casualty clearing station. In treating burns of the face the elementary precaution of avoiding the splashing of picric acid or tannic acid into the eyes should be observed.

Eye wounds from heavy explosives will require the specialized supervision planned to be available at the casualty clearing hospitals and the base hospitals. First aid in these cases will generally consist in bandaging the injured eye. Where there is an adequate staff the casualty clearing hospital should be equipped with the necessary apparatus for dealing with the occasional cases of an isolated prolapse of the iris, as this is an emergency operation.

Suggested Ophthalmic Equipment

The ophthalmic minimum equipment of the first-aid posts and the casualty clearing centres should therefore consist of a supply of bicarbonate lotion, castor-oil drops, atropine drops, double shades, and bandages. Ophthalmic instruments necessary for the urgent operation of abscission of prolapsed iris and the making of a conjunctival flap should be available at the casualty clearing hospitals.

The more leisurely work possible at the base hospital will allow of a wider range of activities, though the nature of the injuries will not give much scope for fine procedures. Mr. C. B. Goulden suggests the following equipment:

Hypodermic syringe.
Needles—hypodermic: (*a*) 1½ inch exploring 24 P.W.G. (*b*) 2 cm. fine.
Lang speculum.
Fixation forceps—2 teeth into 3 teeth.
Lister's conjunctival forceps.
Squint scissors: (*a*) light; (*b*) heavy.
Strabismus hook.
Needle holder (Silcock).
Iris forceps: (*a*) Lang's curved; (*b*) Barraquer's.
De Wecker scissors with blunt points.
Couper's capsule forceps.
Iris repositor. Squint needles.
Silk: No. 1, white; No. 0, black.
A.C. wash-out nozzle.
Rubber tubing to fit nozzle.
Undines.
Keratomes: (*a*) large straight; (*b*) small straight.
Graefe knives. Daviel's spoon.
Discission needles. Scalpels.
Other general surgical instruments from the general theatre.

To this list an evisceration scoop might usefully be added. This list does not include a magnet, as its author feels that opportunities for useful employment of the magnet will be strictly limited.

In London it is planned to have an ophthalmologist available at each casualty clearing hospital and at the base hospitals. In the nature of things their duties in emergency will not be purely ophthalmic, but the planned distribution of available talent should be valuable at the moment of crisis. It is assumed that the treatment of eye injuries will be carried out under conditions allowing the use of light and water. Provision is being made for alternative—and local—supply of light and water should the main supply of either be cut by enemy action or deliberately as a precautionary measure.

The organization that will emerge after the anticipated brief and intensive attack on the civil population cannot at present be foreseen. At its best there will be a rapid return to something like normality; at its worst a skeleton normal service will have to function besides the organization to deal with air raid casualties. The resilience of human nature and the resources of a civilization are things not easily worn down, as the martyrdom and heroism of the peoples of Spain and China in their struggles amply and nobly testify.

Summary

The home conditions likely to exist during the first few weeks after the outbreak of hostilities are discussed.

It is pointed out that organization for special ophthalmic services will be of limited value, but that it is planned to have ophthalmic talent widely distributed.

The effects of ocular injuries from gas are surveyed, together with their treatment.

The lesions from incendiary bombs and the damage from heavy explosives are discussed.

The scope of first aid and the possibilities of treatment at casualty clearing stations and at base hospitals are indicated.

My thanks are due to Dr. J. N. Dobbie of the Ministry of Health and Dr. R. C. Harkness of the London County Council for much of the information on organization contained in this paper. I am also indebted to Mr. C. B. Goulden for a similar service, for permission to use the list of equipment published here, and for kindly placing at my disposal his great knowledge of war injuries.

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SULPHANILAMIDE IN THE TREATMENT OF SCARLET FEVER*

BY

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During the last two years several reports have been made on the effect of sulphanilamide preparations in the treatment of scarlet fever. These show no unanimity in the conclusions of their authors. Proseptasine was used by Peters and Havard (1937) in the treatment of 150 cases of scarlet fever and was withheld from the same number of alternate cases which served as controls. The sum of the individual complications was the same in both groups, but they occurred in a smaller number of patients (35 per cent.) in the test series than in the control series (56 per cent.). The same preparation was used by Hogarth (1937) in a controlled series of 114 patients with scarlet fever, and he found it had no significant effect on the initial pyrexia, the initial toxaemia, or the incidence of complications. Sako, Dwan, and Platou (1938) treated 100 cases of scarlet fever with sulphanilamide, and controlled their test with a similar series of the same number which did not receive the drug. Their findings agree with those of Hogarth in that the toxic stage of the disease was not affected, but they report that complications occurred in eight of the sulphanilamide series against forty-one of the control series. Pfaffenbichler (1938) treated 150 scarlet fever patients with prontosil for eight days from the time of admission to hospital and used the same number of contemporaneous admissions as controls. Of the treated series 46.6 per cent. had an uncomplicated convalescence, whereas this occurred in only 26.6 per cent. of the control series. Cervical adenitis was seen in 14.6 per cent. of the test series against 20 per cent. of the controls, and otitis media in 6.6 per cent. of the test group and 11.3 per cent. of the controls. Scarlatinal rheumatism complicated seven of the control cases, but was absent in the test series.

Present Investigation

Starting in January, 1937, a number of cases of scarlet fever were treated with sulphanilamide (Bayer) and a similar series of control cases were simultaneously treated without the drug. Anti-scarlatinal serum was given to those patients in both groups who were thought to require it, irrespective of the giving of sulphanilamide. It had already been realized in this hospital that sulphanilamide had little or no effect in the acute febrile stage of scarlet fever, except perhaps in patients with a frankly septic type of the disease, and it was thought that the incidence of complications would probably give the best indication of the value of the drug. The test was therefore limited to children under the age of 10 years, as these would include the age groups which normally show the highest complication rates. Alternate patients, as admitted to certain particular wards, were allotted to test and control groups. No selection whatsoever was made in the distribution of cases. The general treatment of the patients in the two groups differed in no way; they were nursed together in the same wards, which contained approximately equal numbers of each group, and received the same nursing and medical attention and the same diet.

The test was continued for twelve months and was limited to three wards. Of the 576 patients, 287 fell into

* Based on a paper read before the Goole and Selby Division and the Leeds Division of the British Medical Association.

the test series and 289 into the control group. The age and sex distribution and day of disease on admission to hospital are given in Table I, and are shown to be comparable in the two groups.

TABLE I.—*Age and Sex Distribution and Day of Disease on Admission to Hospital*

	Age (years):	0–1	1–4	5–9		Eliminated from Series	Total	
Test series	Males	2	71	37	110			
	Females	1	52	90	143			
	Total	3	123	127	253	34	287	
Control series	Males	0	64	45	109			576
	Females	1	61	90	152			
	Total	1	125	135	261	28	289	

Day of Disease on admission:	1st	2nd	3rd	4th	5th	6th	7th	Later than 7th	Total
Test cases	17	101	69	41	12	6	0	7	253
Control cases	18	104	69	38	17	8	2	5	261

It was necessary to eliminate thirty-four and twenty-eight patients from the test and control series respectively, and the reasons for their removal are shown in Table II. Chicken-pox was introduced into all three wards, and prolonged the stay of certain children in hospital. All cross-infected patients have therefore been removed from the series. The small number of patients of ten years or over who were admitted to these wards have also been removed from the series.

TABLE II.—*Cases eliminated from Test and Control Groups*

Reason for Elimination	Test Series	Control Series
10 years or older	13	11
Late case	1	1
Revision of diagnosis	3	4
Concurrent surgical condition	3	1
Concurrent scarlet fever and whooping-cough	1	1
Cross infections	13	10
Total	34	28

The amount of sulphanilamide given was of necessity, in a test of this type, a matter of routine, and, after a trial period previous to the treatment of the cases here reported, was fixed at 0.75 gramme for children under the age of 2 years, 1.5 grammes for children of 3 to 7, and 3 grammes for children of 8 and over in each twenty-four hours. These amounts were divided into three equal doses and continued until the temperature had been normal for a week in uncomplicated cases. If complications developed, administration was prolonged for as long as was indicated. Signs of sulphanilamide toxaemia were seen infrequently, and in no case gave rise to anxiety. Cases of true toxic and septic types were not seen. All patients, both in test and in control groups, suffered from simple scarlet fever, and no death occurred in either series.

Results of Treatment

The early acute stage of scarlet fever seemed to be uninfluenced by sulphanilamide except in those cases in which some septic element was apparent: these subseptic cases appeared to benefit from the drug. The incidence of complications is shown in Table III.

TABLE III.—*Complications (there were no Deaths in either Group)*

	Test Series		Control Series	
	No.	Per cent.	No.	Per cent.
Uncomplicated cases	215	85.0	195	74.7
Complicated cases	38	15.0	66	25.3
Complications:				
Adentitis	13	5.1	19	7.3
Albuminuria	1	0.4	5	1.9
Arthritis	1	0.4	1	0.4
Endocarditis	—	—	1	0.4
Myocarditis	—	—	3	1.1
Mastoiditis (mastoidectomy)	—	—	1	0.4
Nephritis	—	—	3	1.1
Suppurative otitis media	16	6.3	27	10.3
Relapse	1	0.4	2	0.8
Rheumatism	—	—	2	0.8
Rhinitis	11	4.3	11	4.2
Minor sepsis	5	2.0	6	2.3
Total complications	48		81	

Individual complications, with two exceptions, show a greater frequency in the control group than in the test group, and certain complications, including rheumatism, endocarditis, and myocarditis, are absent from the test series but present in the control cases. The incidence of suppurative otitis media is greater in the control series than in the test series, the incidence of this complication being 10.3 per cent. and 6.3 per cent. respectively. Of those who received sulphanilamide, 15 per cent. show complications against 25.3 per cent. in the control group.

Prophylactic Use of Sulphanilamide

It appears, therefore, that an important action of sulphanilamide in the present mild type of scarlet fever is prophylactic in that it lowers the incidence of complications. For this reason an attempt has been made to apply this finding in the treatment of this disease. The scheme has again been limited to children under the age of 10 years. Patients are given 1 gramme of sulphanilamide daily, in four equal doses, from admission until the fourteenth day of disease, and again from the twenty-first day of disease to the twenty-eighth day, when uncomplicated cases of simple scarlet fever are discharged from hospital. In this way a patient receives sulphanilamide for a maximum continuous period of fourteen days, which includes the acute stage of the disease. During the third week, when the patient is entering convalescence, sulphanilamide is withheld. On the twenty-first day of disease, in the majority of uncomplicated cases treated in this hospital, the patients are up and dressed and may possibly come into contact with some source of secondary infection. This in scarlet fever wards is most likely to be streptococcal, so sulphanilamide is resumed from the twenty-first to the twenty-eighth day—the day of discharge.

Since March, 1939, when this method of treatment was instituted in this hospital, to the time of writing—a period of four months—seventy-nine patients have received the

suggested small prophylactic dose of sulphanilamide. The results are as follows:

Age Groups	No. of Patients	No. of Complications	Complications
0–4	54	9	Suppurative otitis media 4 Adenitis .. .. .. 2 Paronychia .. .. 2 Albuminuria 1
5–9	25	0	
Total ..	79	9 (11.4%)	

The number of patients so treated is small and the series has not been controlled, but the results are sufficiently good to encourage further trial of this method. The most striking effect is the comparative absence of the many minor septic sequelae which are a common feature of scarlet fever wards and which prolong the patients' stay in hospital.

Toxic effects due to sulphanilamide appear to be uncommon in children. Cyanosis has not been seen in this group of seventy-nine patients, but a maculo-papular erythema of morbilliform type, which first appeared on the extremities, then on the face, and finally on the body, has occurred in two cases. In one patient this was accompanied by pyrexia, which subsided within forty-eight hours of withdrawing the drug. No other toxic effects were noted.

Summary

In a series of 253 cases of scarlet fever in children under 10 years of age, treated with sulphanilamide, the complication rate was 15 per cent., as compared with 25.3 per cent. in a similar series of 261 controls.

It is suggested that sulphanilamide has a place in the treatment of scarlet fever, and one of its chief values is prophylactic.

Seventy-nine patients have been given small doses of sulphanilamide from admission to hospital until the fourteenth day of disease, and again from the twenty-first to the twenty-eighth day. In this group the complication rate was 11.4 per cent.

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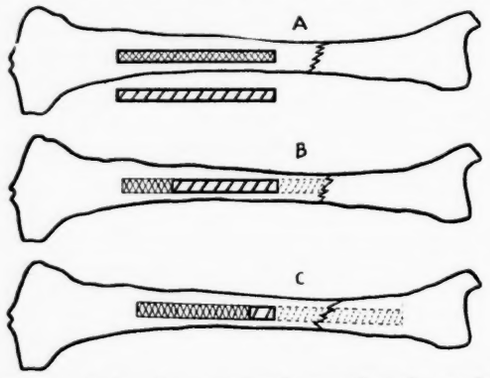
Statistics recently published by the French Ministry of the Interior show a decline in the ratio of fatal accidents to the number of motor cars in circulation. In 1925, when there were only 860,289 motor vehicles in circulation, the fatal accident ratio was 2.35 per 1,000. In 1937, when there were 2,820,816 motor vehicles in circulation the corresponding ratio was reduced to 1.59 per 1,000. Both in 1925 and in 1937 more than half the motor accidents were due to faults of the drivers (59 per cent. in 1925 and 53 per cent. in 1937). Only in 21 to 28 per cent. of cases could the fault be ascribed to others than the driver, to pedestrians, etc. It seems hardly just, therefore, that for every driver there should be two passers-by victims of motor accidents. Material faults of construction were held responsible in only 1.5 to 3 per cent. of the accidents, and the state of the roads in only 5 to 11 per cent. As for the frequency of accidents in different parts of the country, it might have been supposed that the most densely populated areas would suffer from the highest accident rates, but this has proved not to be the case.

Clinical Memoranda

Autogenous Intramedullary Bone Pegging

In cases of non-union or delayed union in fractures of long bones and in occasional instances where the ordinary methods of mechanical fixation are inadequate, the necessity for some mode of internal splintage may arise. Many methods and materials have been tried, but the autogenous bone graft is undoubtedly the most certain, as fixation is through the medium of living bone. The insertion and fixation of the graft presents difficulties, and



A: The graft has been removed, exposing the medullary cavity. B: The graft (marked with heavy diagonal lines) has been driven from below upwards into the medullary cavity of the upper fragment until its lower end is flush with the fractured surface, and the fragments have been placed in alignment. C: The graft has been driven downwards, so that one half remains in the medulla of the upper fragment and one half in the lower fragment.

different methods have been employed with varying success. The following method of intramedullary pegging appears to possess some advantages, and is certainly simple and effective in its application. It is peculiarly applicable to fractures of the tibia, although it has been employed in other parts of the skeleton.

The following are the steps of the operation:

A long incision is made on the antero-medial aspect of the leg and the flaps are dissected up on either side, exposing the corresponding surface of the bone covered by periosteum. The fracture is then fully exposed by bending the leg to a right-angle at the site of the lesion. In cases of non-union the ends are freshened, exposing healthy medulla, and all scar tissue is cut away. A longitudinal incision is now made in the periosteum of the longer of the two fragments of the tibia, the length of this incision being that of the graft desired—generally 4–5 inches. Transverse cuts are made at either end and the periosteal flaps so formed are elevated from the bone and turned back. By means of a circular saw a graft is cut from the exposed compact layer of the bone and removed. The transverse thickness of the graft should be such that it will fit tightly into the medullary cavity of the tibia. The peg is now driven into the medullary cavity of the fragment from which it was removed, the fractured ends of the bone set in alignment, and, by means of a bone punch inserted through the deficiency in the compact layer, the graft is hammered into the medulla of the other fragment to a distance of half its (the graft's) length. The ends of the bone are by this means firmly held in position and, provided that the graft is long enough and fits sufficiently tightly in the medullary cavity, no distortion is possible.

The accompanying diagrams explain, more fully perhaps than words, the steps of the operation.

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Spontaneous Rupture of the Bladder

The following case is reported because of its importance in differential diagnosis and because of its rarity. On careful consideration we believe this to be a genuine instance of spontaneous rupture of the bladder.

CASE REPORT

On November 18, 1938, a woman aged 38, who had had four previous pregnancies, was admitted to hospital as an emergency case. She was three months pregnant. Five days before admission she complained of severe backache associated with general malaise and loss of appetite. Two days later she was seized with acute abdominal pain, localized to the hypogastrium. She said it felt as if something had given way inside her. Subsequently she complained of continuous pain, and noticed that her abdomen was gradually becoming distended. Impairment of appetite continued, and she vomited clear fluid several times. There was no bowel movement for three days before admission. She did not consult her doctor until the day on which she was sent to hospital—that is, three days after the estimated time of rupture. There was no history of vaginal haemorrhage. She had not passed urine normally for three days, but it had dribbled away in small quantities, causing a burning sensation.

On admission the patient looked toxic and had a waxy complexion. The pulse was poor in quality, its rate being 116; the temperature was 97.4°. Her general appearance did not suggest that she was acutely distressed. The abdomen was prominent, and tenderness was widespread. The prominence was highly tympanitic, but there was dullness in the flanks. Left shoulder tip pain was present. On vaginal examination the uterus was found to be gravid, acutely retroflexed, and impacted, the cervix being high up behind the symphysis pubis. A rubber catheter was passed and only a few drops of blood-stained urine withdrawn. No serious attempt was made to rectify the malposition of the uterus by intravaginal manipulation because it was obvious that the abdomen must be opened, a provisional diagnosis of ruptured bladder having been made.

After anaesthesia had been induced by open ether the ward sister passed a metal catheter and drew off 16 oz. of dark blood-stained urine. Then the flow ceased. As she withdrew the catheter the flow started again, but the fluid was now clearer. The abdomen was opened by a mid-line incision and was found to be full of dark blood-stained fluid, similar to the 16 oz. mentioned above, with a urinous smell. At this point the patient suddenly collapsed and died, and despite active measures could not be resuscitated. Further investigation revealed a hole in the fundus of the bladder large enough to admit the point of the index finger. There was no definite evidence of peritonitis or of intestinal distension, in spite of the fact that the rupture must have taken place about three and a half days previously.

Calverley (1916) reports a somewhat similar case, but the estimated interval between rupture and operation was much shorter. The mortality rate given by Hamilton Bailey is 11 per cent. where operation is performed within the first twenty-four hours; after that it rises to 55 per cent. Certain cases have been described in which uraemic symptoms took precedence over the peritonitic symptoms. According to Thomson-Walker rupture of the bladder, apart from trauma, is very rare. He states that mortality depends upon the severity of the injury causing the rupture, the amount of soiling of the abdominal contents, and the time lapse before operation.

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Reviews

VIRUS DISEASES

Handbuch der Viruskrankheiten mit besonderer Berücksichtigung ihrer experimentellen Erforschung. Volume I. Edited by Professors E. Gildermeister, E. Haagen, and O. Waldmann. (Pp. 652; illustrated; RM. 40; bound, RM. 42.50). Jena: Gustav Fischer. 1939.

With the publication of this work the rapidly growing list of textbooks devoted to the subject of viruses has received yet another addition. In its compilation the three principal authors have had the assistance of a considerable number of German scientists well known for their work in this particular branch of microbiology, and their aim has been not only to present an up-to-date account of the different viruses, but also to describe the methods available for the study of these agents and of the diseases they produce. The book is appearing in two volumes, the first of which is here the subject of review. It is divided into two parts—general and special. The general portion opens with a historical account of the development of virus knowledge by E. Gildermeister, which, though good, contains two rather surprising errors in one of the tables. This table, on page 7, gives a summary of what is known concerning size, visibility, and cultivability of viruses, and from it one would infer that the virus of molluscum contagiosum had not been stained or seen and that the virus of lymphogranuloma inguinale had not been cultivated with certainty; both statements are at variance with fact and with what appears later in the volume.

K. Herzberger contributes a chapter on the classification, morphology, and estimation of the size of viruses. E. Haagen writes on filtration, the behaviour of viruses in the animal body and the cultivation of viruses, and the general part of the book closes with a chapter on immunity by H. Gins. The treatment of these subjects is adequate, though at times the presentation is a little one-sided. In the last chapter, for instance, the question of immunization with killed viruses receives inadequate treatment, and in the discussion on the value of convalescent serum in the early treatment of poliomyelitis the author concludes in favour of this procedure without even mentioning the figures obtained by Park in his extensive investigation of this question. This part of the book contains a number of illustrations, including three excellent coloured plates.

The special part of the volume is devoted to those viruses which produce generalized infections. These are divided into four main groups: (*a*) those associated with pustular eruptions—the various pock diseases; (*b*) those characterized by vesicular eruptions such as herpes, foot-and-mouth disease, and vesicular stomatitis; (*c*) the exanthemata; and (*d*) virus diseases of a septicaemic nature. Presumably this classification has been adopted as a matter of expediency as some such grouping of the numerous viruses becomes almost essential in a book of this kind. In the space of a review such as this it would be impossible to deal critically with each separate contribution. Some, such as the account of foot-and-mouth disease, coming from authorities like Waldmann and Nagel, are excellent, and the chapters on herpes and yellow fever by Gildermeister and Haagen respectively are also very good. Others perhaps do not reach quite such a high standard. It is inevitable that occasional statements should occur which would not meet with general approval; quite naturally the author gives promi-

nence to his own point of view. In the article on herpes, for instance, Gildermeister maintains the view that there is some cross-protection between herpes and vaccinia, though he does cite the evidence to the contrary, and he evidently considers that immunity in experimental animals to herpes virus may be largely a tissue immunity, a view which is open to criticism. However, one can say that in general this book is good, and that it is a real addition to virus literature. It is well printed, and contains numerous excellent illustrations and a copious bibliography.

LUMLEY, VOL. II

The Public Health Acts. Annotated with Appendices containing the Various Incorporated Statutes and Orders of the Minister of Health. By Erskine Simes, M.A., Charles E. Scholefield, and A. N. C. Shelley, M.A., B.C.L. In four volumes. Volume II, eleventh edition. (Pp. 2,341; index 113; thick paper, 84s. per volume, thin paper, 86s. 6d.) London: Butterworth and Company. 1939.

The first of the four volumes which will compose the eleventh edition of Lumley's *Public Health* has already been reviewed in these pages. The second, which now appears, principally includes the completed consolidating Acts, grouped on this occasion not by the order of their coming into operation but with reference to the subject-matter with which they deal. This arrangement has a certain convenience, at least for medical users of the work, who will find the statutes relating to midwives assembled in one place. The Midwives Acts of 1902, 1918, 1926, and 1936 follow one another in an engaging sequence, each amending or repealing parts of its predecessors. The Act once known as the Midwives and Maternity Homes Act, 1926, falls now to be cited *simpliciter* as the Midwives Act, 1926, the provision as to maternity homes which it originally contained having been in the first place absorbed by the Nursing Homes Registration Act of 1927 and finally incorporated in the Public Health Act of 1936. Other enactments presented which in varying degrees touch upon medical interests are the Food and Drugs Act, 1938, the Hydrogen Cyanide (Fumigation) Act, 1937, the Housing Act, 1936, and the Town and Country Planning Act, 1932.

The long list of statutes referred to in the annotations to sections goes back to one of Henry VI, which still forbids the holding of markets on Sundays or certain Saints' Days. Another early reference is to an Act of Mary Tudor, a portion of which relating to "the phisitions in London" is repealed by the Food and Drugs Act, 1938. This last-named Act repeals also the whole of the Food and Drugs (Adulteration) Act of 1928. As a result the time-honoured expression "mix, colour, stain, or powder" disappears from the catalogue of things that are not permitted to be done to food, and the relevant section runs more broadly to the effect that no person may "add any substance to food so as to render the food injurious to health." Section 10 of the Act repeals also Sections 116 and 117 of the Public Health Act of 1875, dealing with the seizure of unsound food, which had eluded the consolidating sweep of the Public Health Act of 1936. Slaughter-houses, which come into the Food and Drugs Act, had previously under the old Public Health Act been held to include "the places commonly called knackers' yards." Now the two are distinguished from one another by the obvious but useful definition that if the flesh of the animals killed is intended for sale for human consumption it is a slaughter-house; if such is not the intention, it is a knacker's yard.

The short Hydrogen Cyanide (Fumigation) Act empowers the making of regulations for the use of this dangerous substance as a gaseous lethal agent for rats and arthropods. The Factories Act, 1937, is only presented in so far as it touches provisions concerning local authorities, such as the means of escape in case of fire.

This volume is the first of the series since 1908 not to have enjoyed the distinguished collaboration of Sir Joshua Scholefield, to whom appreciative tributes are paid in prefatory notes by both editors and publishers.

TRAUMA AND NEW GROWTHS

Relation of Trauma to New Growths. Medico-Legal Aspects. By R. J. Behan, M.D., F.A.C.S. (Pp. 425. 22s. 6d.) London: Baillière, Tindall and Cox. 1939.

This book is inscribed "To the harassed doctor who on a pillory between cupidity and consciousness must decide to satisfy his conscience and not appease his greed." A doctor called to give evidence in a compensation case and finding himself in a position so uncomfortable as this would be well advised to put the book aside until the case is over, or his worries will be multiplied.

One chapter is devoted to occupational cancers, chemical and other types of irritation being covered by the definition of trauma. The experimental study of carcinogenesis has provided a firm basis for an analysis of the causation of cancer by substances used in industry. Unfortunately the author is not well informed about laboratory investigations; he names phenanthrene as a carcinogenic compound present in coal tar, and seems undecided whether tar cancer develops in mice after three weeks (p. 134) or three months (p. 93). He believes, contrary to the evidence derived from experiment, that individuals are most susceptible to carcinogenic agents when they reach the age at which spontaneous malignant tumours commonly become manifest.

The greater part of the book deals with "trauma" in the narrower sense of "destructive action through accident." Malignant tumours have not been produced experimentally by a single injury, and the scarcity of tumours which can be attributed to war wounds is noteworthy. It is widely agreed that the apparent production of a cancer by a single injury needs the closest scrutiny. It should be proved that the accident really happened, that it was of sufficient severity, and that it occurred at a reasonable interval before the cancer developed; the accident and the cancer should be connected by "bridging symptoms," and the absence of cancer at the time of the accident should be established. Ewing, in an excellent review of the subject in the *Archives of Pathology*, 1935, **19**, 690, stresses the frequency with which injury draws attention to a pre-existing tumour; he calls this "traumatic determinism." Behan acknowledges the importance of traumatic determinism and the infrequency of traumatic cancer, but complains that "... in many instances pathologists are very narrow in their point of view, and because they deal with definitely definable changes they are impatient at the clinician's assumption that a probability can metamorphose into a fact; especially are they dubious when the relationship is not definitely demonstrable."

Untroubled by the narrowness, the impatience, and the doubts which afflict pathologists, Dr. Behan reviews reports of cancers produced by injury in every part of the body, including many cases in which the diagnosis of the lesion is not established and the relation to trauma speculative. Undoubtedly the evidence that a cancer was produced by an injury is sometimes strong, and cannot be rebutted by the medical witness. One American court decision, quoted by Behan, states that "if the medical profession conceded that it did not know the cause of cancer, the connecting events between the cause and effect

in this case might be sufficient to justify the conclusion that the injury was the legal cause and that the result should be compensable." This attitude seems just; the sufferer receives, and deserves, the benefit of the doubt. The benefit to the claimant is perhaps unduly great when an accident hastens the death of an individual already suffering from cancer. Ewing considers that a recognition of partial liability is necessary to meet these conditions. The medical witness should recognize the infrequency of traumatic cancer, but not deny the possibility. Each case must be decided on its own merits by the application of common sense and accepted principles.

Dr. Behan's book confuses rather than clarifies. It is swollen to 393 pages by bad construction, careless repetition, and prolixity. The literary style is distressing. The numerous reports of trials, mainly in American courts, are sometimes entertaining, but provide little guidance to English legal practice. The references, also numerous, would be useful if accurate; those in which the reviewer has a personal interest are not. Misprints abound. The author's opinions on the nature and causation of cancer do not merit acceptance, and his statements of fact are not always reliable.

TREATMENT OF OBESITY

Slimming for the Million: The New Treatment of Obesity. A Practical Guide for Patient and Physician. By Dr. Eustace Chesser. (Pp. 119; 3s. 6d. net.) London: Rich and Cowan. 1939.

Dr. Chesser's manual attempts to cover the facts of nutrition especially as they affect the obese. The author states that he hoped to provide a practical guide to both practitioner and patient to the main principles of managing obesity, and the title and set-out of the book are obviously meant to have a popular appeal. After an elementary account of the use of food for energy production and of energy expenditure in the activities of the body, various diet cures are mentioned, with the conclusion that what matters is not the quantity of food consumed but its nature, and the injunction is given to omit the fat-forming foods. Baths and drugs are of no great value; some of the latter are far from harmless. The essential thing is not to add fat to the body by eating it—that is, by taking amounts of the fat-forming foods (fats and carbohydrates) above requirements. Vitamins are needed, but may be added as concentrates to any diet; some diets advocated for treatment of obesity—for example, full meat or protein diet—may be deficient in some essential vitamins. In sum, if we seek to fix responsibility for excess weight, the fat man or woman is the guilty party through eating fat-forming foods. In Chapter VII lists are given of the various foods and beverages grouped into three classes: those which may be taken by the obese, those which are better left alone or taken in moderation, and those to be avoided. The tables, covering eleven pages, contain figures conforming with those of modern food-value determinations, but it is unnecessary to give calories to the second decimal place for "average helpings"; whole numbers would be easier for addition. The figures appear otherwise reliable except in the case of wines, spirits, and liqueurs, in which astonishing values are given for the calories from protein content. It may be that the calories from the alcohol are included in the heading "Calories from Protein," which is misleading, or that the author is under the misapprehension that the calories from protein are not fuel providers and may be neglected—a statement which appears in the text.

In the second half of the book the appeal is to both doctor and patient; some of the matter is irrelevant, and statements are made which tend to lessen the value of the author's insistence that in cases of obesity the fat comes from food and from food only. Physicians of experience know that determining the basal metabolic rate is an important aid in diagnosis and that du Bois's formula for surface area applies to all shapes. Nor will they allow that thyroid "may be taken without the slightest ill effects whether real or apparent when the patient is on a full diet," agreeing rather with the later statement that on no account should the patient take thyroid other than under medical supervision. Dr. Chesser gives patients 12 to 15 grains of thyroid daily, which appears rather medical compulsion than careful supervision. Constitutional factors may not be important in many cases, but we feel that more emphasis should be laid on the psychological factors—greed and laziness—patients being unwilling to exert themselves in controlling their appetite or arranging their exercise. The book is readable, but apart from the tables does not seem practical enough for a patient or detailed enough for a doctor.

ANATOMICAL DISSECTIONS

Principles of Human Anatomy. With Synopses and Bibliography. By Charles F. DeGaris, M.D., Ph.D., Ernst Lachmann, M.D., and Ralph E. Chase, B.Sc. (Pp. 239; 12s. net.) London: Henry Kimpton. 1939.

This book, by Professor C. F. DeGaris, Professor E. Lachmann, and R. E. Chase, is the outcome of an endeavour to systematize and place on record in book form certain alternative methods of dissection which have been evolved in the anatomical laboratories of the Universities of Wisconsin and Baltimore under the guidance of three celebrated teachers, Drs. F. P. Mall, C. R. Bardeen, and L. H. Weed. The original schemes of work have now been modified to suit modern requirements, and more especially with regard to the limit of time which has recently been imposed upon the periods allotted for the study of gross anatomy. This restriction is expressed in a characteristic manner by the author himself, in the following words: "If the pressure of time is felt at every point of our programme—and such indeed is the case—we can only interpret this as meaning that anatomy does not fit the livery of time prevailingly cut for it."

The descriptions of the alternative schemes of work are followed by synopses in which terms are defined and muscles are grouped according to their action, nerve supply, and mode of development, and an introduction is devoted to *x*-ray diagnosis based on fluoroscopic and radiographic examinations. Tables are given showing the components of the cranial nerves, and there is also a description of the autonomic nervous system, founded on modern conceptions and illustrated by various practical and theoretic examples of its mode of action. The descriptive parts of the book are finally supplemented by a most useful bibliography, which gives a classified list of special articles and books dealing with recent anatomical research and includes the principal standard works and atlases of anatomy, to which the student is referred for illustrations.

Notes on Books

The operations of lobectomy and pneumonectomy have passed out of the experimental stages; they are now established as a mode of treatment for certain diseases that gives results which cannot be obtained by any other method. By his methodical compilation of the information available on this subject in a thesis presented to the University of São Paulo Dr. ORLANDO DE SOUZA NAZARETH

has done a service to thoracic surgery. This thesis has recently been published as a monograph entitled *Lobectomias e Pneumonectomias* (Emprêsa Gráfica da "Ravista dos Tribunais," São Paulo). It contains the account of only one original observation, but in respective chapters the author reviews the history, evolution, and actual importance of the operations; their physiopathology; ligature of the lobar and pulmonary pedicles; the operations carried out with free and adherent pleura respectively; operative technique; operative and post-operative complications; results; and indications. There is a bibliography of 176 references. Of the sixty-eight illustrations nearly all are reproduced from other authors. They have been well chosen, but the quality of reproduction varies considerably, and is poor in the case of the skiagrams.

Die Malaria Uebertraeger, by Dr. FRITZ WEYER, is published by Georg Thieme of Leipzig at RM. 9.80. It should prove a useful book of reference to all interested in mosquito control in relation to malaria. It is well understood that all anophelines are not of equal importance in the transmission of malaria, but it is now becoming increasingly recognized that differences in the "varieties" or "races" within a given species are of the greatest significance, and that in order to combat malaria successfully and at the same time economically due attention must be paid to these biological differences. The opening chapters deal in a general way with the various factors determining the importance of a given species in a given area, and examples are cited from all countries. This is followed by a geographical survey of the various malarious areas of the world, and the species of anophelines carrying malaria found in each. The third section of the book is devoted to the distribution, breeding habits, and bionomics of the forty-six proved anopheline vectors given in alphabetical order. Then comes a similar section on twenty-four additional species of lesser importance or whose significance in the transmission of malaria is less clearly established. The fifth section contains a list of the most dangerous malaria carriers and the different areas in which they are found. Finally, there is a comprehensive alphabetical list of original papers bearing on the subject. The work is not intended for the identification of mosquitos and keys are not given, but it should provide a ready source of reference to the main facts about any given malarial vector.

Preparations and Appliances

PORTABLE CLOSED-CIRCUIT ANAESTHETIC APPARATUS

Dr. H. L. THORNTON (St. Andrew's Hospital, London, E.3) writes:

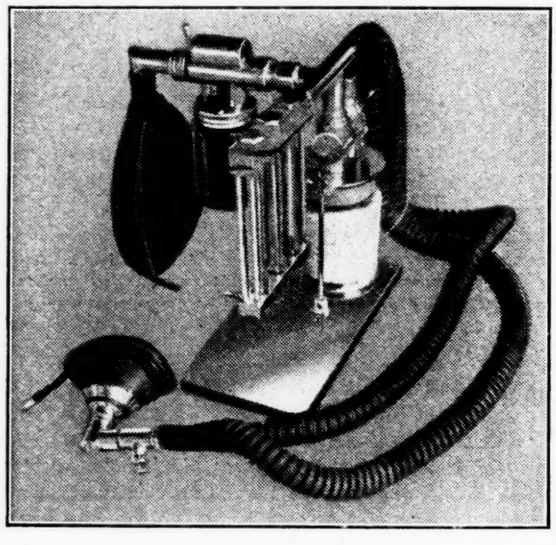
The apparatus illustrated was originally designed to meet my own requirements for a simple general-purpose anaesthetic machine embodying the closed-circuit principle with carbon dioxide absorption. Since this apparatus possesses the merits of portability and comparative simplicity, a brief description might be of interest to other anaesthetists who seek these features.

Gases are admitted to the machine through a set of dry bobbin flowmeters, calibrated for nitrous oxide, oxygen, and cyclopropane, the latter alternatively serving for carbon dioxide (if only gas, oxygen, and ether are being used), and pass directly to the main part of the apparatus, which consists of a glass soda-lime canister holding 1 lb. of soda-lime, and an ether vaporizing bottle operating between the patient and the rebreathing bag. A system of valves placed between the two flexible breathing tubes and the face-piece provides for a unidirectional circuit through the absorber. A spring-loaded expiratory valve of the Magill type is placed near the face-piece, and is normally kept closed by means of a thumb-screw. A by-pass valve, operated by a small lever, enables the absorber to be excluded from the circuit when desired. In slightly more detail the component parts are as follows:

Absorber.—A strong glass jar, on the head of which is carried the main part of the apparatus. Efferent gases are led by a wide tube to the bottom of the jar, below the soda-lime. Afferent gases are collected above the soda-lime and return to the patient.

Valves.—Mica diaphragms rest on annular bronze seatings, enclosed in cylindrical housings. No spring loading is employed, the valves being operated by positive and negative pressure only, acting against gravity. They are situated in extensions of the breathing tubes, close to the absorber.

Ether Vaporizer.—A glass jar, provided with a screw top and filling vent, holds 8 oz. of ether. It is placed between the absorber and rebreathing bag, and a by-pass valve allows any



desired fraction of the inspired and expired gases to travel over the surface of the ether. Vaporization is assisted by a broad wick enclosed in copper gauze (to retard condensation of moisture) placed between the afferent and efferent ports. The vaporizing unit is detachable, and fits on the main apparatus by means of a tapered joint. It is readily removed for cleaning purposes, and for convenience when the "head" of the apparatus is lifted to recharge the absorber.

The head is retained on top of the canister by means of two thumbscrews threaded on hinged upright rods placed on either side of the canister. A thick rubber washer makes a gas-tight joint between the head and the absorber. A Goldman's vinesthene dripper may be fitted, if desired, between the breathing tube and absorber on the afferent side of the machine. The breathing tubes connect with the face-piece by a Y-piece and angle-piece, the expiratory valve being interposed between the two.

The design of the apparatus appears to offer three main advantages: (1) compactness—the overall measurements are 12 by 6 by 12 inches; (2) simplicity and sensitivity of valve action; (3) efficient ether vaporization, assisted by warm circulating gases, rendering deep anaesthesia quickly available when required. The apparatus, which was constructed for me by Medical and Industrial Equipment, Ltd., of 12, New Cavendish Street, W.1, is finished in chromium plate, and mounted on a light baseboard for use on a cylinder trolley.

My thanks are due to Sir Frederick Menzies, Medical Officer of Health for London, and Mr. J. R. M. Whigham, Medical Superintendent of St. Andrew's Hospital (L.C.C.), Bow, for permission to publish this note, and I should particularly like to express my gratitude to Mr. W. D. Copp, engineer in charge of St. Andrew's Hospital, and his assistant, Mr. A. J. Brentnall, for their valuable help and technical advice in designing the apparatus.

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CHEMICAL AGENTS AND VIRUSES IN CANCER

There are two types of agent—chemical and microbic—which are known to be capable of inducing malignant growth, and can be made to do so at will in the experimental animal. Various chemical stimuli cause cancer, particularly of industrial types, in man, and tar or its active constituents will regularly produce it in animals. Cancer of microbic origin—if it be granted that filterable viruses are micro-organisms—is exemplified clearly only in certain naturally occurring tumours in birds, which can regularly or frequently be reproduced by inoculation with a cell-free filtrate of tumour substance. At first sight these would appear to be utterly distinct and unrelated modes of carcinogenesis, implying that malignant growth can arise in more than one way. Nevertheless some of the greatest authorities in this field are unwilling to accept this interpretation, and the belief has been gaining ground that all malignant tumours in whatever animal species owe their continued activity to the presence of a virus, the original chemical stimulus (where such a factor is known to have been at work) being merely a predisposing cause. It should be understood that so far as human cancer is concerned, and indeed all mammalian cancer, with very few exceptions of doubtful significance, this is only a hypothesis unsupported by any direct evidence. A review of the work in this field may help to a clearer understanding of the issues involved.

In 1910 Rous described a transplantable sarcoma of a domestic fowl and found, later, that it was transmissible by an agent separable from the tumour cells. Subsequently many other filterable sarcomata were found in fowls. The broad result of the study of these tumours was the demonstration that they combined the essential properties of mammalian tumours with the distinctive property of being transmissible by agents which resembled filterable viruses. Many students of cancer adopted the view that sarcomata in fowls were produced by viruses in much the same way as tumours in mice were by tar or carcinogenic hydrocarbons, but they considered that viruses were not the cause of mammalian tumours because the latter were not filterable. Gye and others maintained that non-filterability was no proof of the absence of a virus and, further, that the fowl tumour agents differed from all other carcinogenic agents, since they gave rise to growths identical with those from which they were derived and in doing so were multiplied. The controversy entered a new phase in 1933–4 with reports of the cell-free transmission of sarcomata induced in fowls by tar and the production of tumours in rabbits by the Shope papilloma virus. Several investigators stimulated the formation of sarcomata in fowls by injections of tar or of carcinogenic hydrocarbons, but could not transmit them by filtrates. McIntosh,[1] however, reported that he had transplanted five sarcomata induced by tar and transmitted three of them by cell-free filtrates. Recently he and Selbie[2] have described five more tar sarcomata; four were transmitted by tumour emulsions and two of these by filtrates. McIntosh and Selbie conclude that active virus can be demonstrated in a large proportion of chemically induced tumours and that tar-induced sarcomata of fowls are virus tumours. They suggest that the failure of others to transmit induced tumours may be attributable to differences in technique or to chance, since all induced tumours do not behave alike and relatively few have been studied. They suggest, further, that the consistent inactivity of filtrates of a few induced tumours which have been transmitted for considerable periods by grafts may be due to variation in the relation of the virus to the tumour cells, to a decrease of virulence, to the presence of an inhibitory substance, or to the virus being too large to pass through the filters. Andrewes[3] and Foulds,[4] using serological methods, found evidence that an antigenic component similar to the infective agent of Rous sarcoma was present in two tumours which never yielded active filtrates.

Rous and Beard published a preliminary account of observations on the Shope rabbit papilloma in 1934 and Rous[5] summarized the early work in 1936. The main features are as follows. Cutaneous papillomata are endemic among cottontail rabbits in certain parts of the United States, and Shope found that they were transmitted by a filterable virus. The virus gave rise to similar but not identical tumours in domestic rabbits; usually virus was not recoverable from these papillomata, although there was serological evidence for its existence. Rous and his colleagues made autologous grafts of papilloma tissue into muscles and internal organs. The resulting growths had strong histological resemblances to malignant tumours. The virus infected only epidermal cells and the progress

[1] *Brit. J. exp. Path.*, 1933, **14**, 422.
[2] Ibid., 1939, **20**, 49.
[3] *J. Path. Bact.*, 1936, **43**, 23.
[4] *Amer. J. Cancer*, 1937, **31**, 404.
[5] Ibid., 1936, **28**, 233.

of the papillomata was modified to some extent by various procedures. Eventually papillomata on domestic rabbits developed into undoubted carcinomata which metastasized and killed their hosts; papillomata on cottontail rabbits rarely became malignant. Virus was not recovered from the carcinomata, though serological evidence in favour of its presence was obtained. The papillomata developing on normal scarified skin were benign tumours remarkably uniform in type; they grew for many months before malignant characteristics were apparent. Rous and Kidd[6] then found that virus injected intravenously often localized in rabbits' ears which had been repeatedly tarred and produced a variety of benign papillomata and carcinomata differing from the ordinary. The distinctive peculiarities of these anomalous tumours were noted at their first appearance; continued tarring stimulated the growth of the tumours and accentuated the anaplasia of the malignant ones, but it did not hasten the change of papillomata into carcinomata. Virus localizing in skin which had been tarred for short periods gave rise to papillomata of the ordinary type. Some preparatory change in the epidermal cells was essential for the development of the anomalous tumours, and as a rule it was not accomplished until the skin had been tarred to almost the extent necessary for initiating tar warts in some of the rabbits. Lacassagne and Nyka[7] obtained similar results by using benzpyrene instead of tar, and somewhat similar observations, as yet unconfirmed, were reported by Andrewes, Ahlstrom, Foulds, and Gye.[8] Two sarcomata were induced by the injection of Shope fibroma virus into rabbits which had received intramuscular injections of tar. One sarcoma was transplanted, but no evidence of the persistence of virus was obtained. In normal rabbits the fibroma virus causes fibromatous lesions which invariably regress.

Recent researches, therefore, focus attention on the possibility of a co-operation between viruses and chemical agents in the origin of tumours. It is conceivable that mammalian tumours contain agents which cannot transform normal tissues into tumours but which might transform tissues altered by carcinogenic agents. Woglom,[9] who investigated this possibility, injected preparations of the transplantable mouse tumour 37S into mice which had been painted with benzpyrene but observed no modification of the benzpyrene lesions, so that no extracellular agent was demonstrated by the method used. Woglom's experiment is open to criticism, for it is improbable that epithelial lesions of the skin are appropriate for detecting an agent from a tumour which, in the general view, is a sarcoma. Moreover, the experiment would probably fail if repeated with Shope tumours in domestic rabbits; the papilloma virus certainly originates the tumours but is not recoverable from them. The failure to demonstrate a virus does not prove its absence; so much is sure, but those who believe that all mammalian tumours are caused by viruses must bear the onus of proof. Meanwhile, it is reasonable to accept Woglom's view that the established facts "justify the continued search for an extracellular aetiological agent in mammalian new growths as fresh methods of investigation present themselves."

[6] *Science*, 1936, **83**, 468; *J. exp. Med.*, 1938, **68**, 529.
[7] *Bull. Ass. franç. Cancer*, 1937, **26**, 154.
[8] *Lancet*, 1937, **2**, 893.
[9] *Amer. J. Cancer*, 1939, **35**, 374.

ANALYSIS OF HUMAN ABILITY

We all use such phrases as "A is a man of great general ability"; "B is very good at his job but no use outside it." We all feel that "general ability" is something very desirable and should be measured. But how? If a general impression is to be the standard what are we to do when the general impressions produced on a number of people differ? The alternative must be some relatively objective, standardized method. When, thirty-five years ago, Professor Charles Spearman proposed a psychological-statistical method which seemed to give prospects of isolating measures of general ability psychologists and educators were deeply interested. Were we in sight of a method which would free the assessment of general ability from the distortions of emotional bias in judges and the complications of differences of mere acquirements of knowledge? Years of experimental work have revealed that the assessments of general ability by methods, or generalizations of methods, proposed by Professor Spearman are less clear-cut and unambiguous than practical men hoped.

The literature of the subject is large, the methods of research complex; Professor Godfrey H. Thomson has undertaken the task of providing a beginner with a guide.[1] Most scientific methods arise out of direct practical needs. The need, for instance, to solve a simple equation in one or two unknowns is evident and easily met. But as the number of unknowns increases the labour of straightforward application of the four rules of arithmetic grows and a systematic plan is framed; one writes down the quantities involved in a particular square arrangement and has a "determinant." The original utilitarian object is never forgotten, but it may be relegated to a corner of

[1] *The Factorial Analysis of Human Ability*. By Godfrey H. Thomson, D.Sc., Ph.D. University of London Press. (16s.)

the mind; determinants become of interest for their own sake, and it is discovered that their properties have other uses than the solution of simple equations. A step further is taken, one passes from the particular square arrangement which is a determinant to any rectangular arrangement and has a "matrix" or "set," the properties of which become the object of interest. This is not an irrelevant digression. One begins by testing a number of persons, say by examining them in a school subject. But an examination in or test of one ability cannot reveal the whole intellectual ability (or temperamental type), so the one test becomes many, a battery of tests, and the interrelations of the scores, their correlations, become a primary object of study. There is a matrix of correlations. What are the characteristics of this matrix? What "law" connecting its elements gave it being? It is the need to answer such questions which makes the methods seem complex. Indeed the best preliminary to study of the methods for those with leisure and some interest in abstraction and notation is to read a book on matrix algebra. But it is always possible, or nearly always, to pass backwards from a framework of a formal character to a set of numerical equations and justify faith by arithmetic, and this is the best path for most students.

Professor Thomson's plan is to relegate a concise mathematical statement in matrix form to an appendix and, in the body of the book, to work out arithmetical examples, beginning with the simplest cases—when a particular matrix of correlations is adequately described in terms of one general and a number of specific factors. He also makes great use of diagrams to help a reader with some power of visualization. We think this method is right, but it is essential for the reader to do the arithmetic for himself, unless he is a mathematician and can understand the appendix. One cannot have it both ways. A chess "master" may be able to visualize a game on simply reading the moves as recorded in a newspaper; an ordinary amateur must play the moves over on a board. The student who works out the arithmetical illustrations, paying particular attention to chapters II and V of Part I and the whole of the arithmetic of Part II, will have acquired a grasp of the technique of factorial analysis. The tests now used are no longer only those believed to explore the cognitive side of human nature, but extend to the conative aspects—indeed some of the most important recent work is concerned with temperament—so that the subject-matter is now of medical as well as educational interest. Since, as Professor Thomson remarks, "with all the dangers and imperfections which attend it, it is probable that the factor theory will go on, and will serve to advance the science of psychology," it is desirable that members of our profession should at least know how the work is done and what the terminology means. Professor Thomson, especially in the first two parts and again in the fourth part of his book, enables the ordinary educated man to obtain that knowledge. But if the question be posed whether this method of expression is more than an elegant notation, permitting a concise summarization of complex data, whether in fact it throws any new light upon the arcana of the mind, Professor Thomson's answer is not encouraging. We have not space here to enter upon a discussion of the difficulties. Further, the importance of improved notation is so great in all branches of science that even were the new methods merely of notational importance they would be well worth learning, and some good judges have higher hopes.

GROWTH HORMONE

The complete cessation of growth after hypophysectomy, the demonstration by Evans and Long[1] of giant rats produced by injection of pituitary extracts, and the similar production of acromegalic symptoms in dogs described by Putnam, Benedict, and Teel,[2] confirmed by Evans,[3] leave little doubt of the major part played by the pituitary gland in the control of normal growth. There has been, however, much discussion, at times quite acrimonious, about the identity of the hormone responsible for these effects. Whereas Evans and his colleagues maintain that they are due to the action of a specific growth hormone, Riddle and Bates[4,5] suggest that the growth effects of pituitary extracts are the result of "a balanced combination" of prolactin, thyrotrophic, or, perhaps, adrenotrophic hormones. In the first issue of the new *Journal of Endocrinology* there is a paper by Freud, Levie, and Kroon[6] dealing with the mode of action of the growth hormone. They adopt a common-sense attitude towards the question of its identity by saying that their extracts are "practically free" of prolactin, corticotrophic, and thyrotrophic activity. They find it hard to believe that a 40 to 100 times reduction in the potency of their extract in prolactin, thyrotrophic, and adrenotrophic activities could be brought about by fractionation without at the same time affecting the growth potency of the resultant extract if this depended on the balanced combination suggested by Riddle and Bates. The question appears to be academic rather than real at the present stage of pituitary physiology and until the various fractions are isolated in a pure form. As to the mode of action of the responsible factor, Freud and his colleagues show

[1] *Anat. Rec.*, 1921, **21**, 61.
[2] *Arch. Surg.*, Chicago, 1929, **18**, 1708.
[3] *J. Amer. med. Ass.*, 1935, **104**, 1232.
[4] *Endocrinol.*, 1933, **17**, 689.
[5] *Proc. Soc. exp. Biol.*, N.Y., 1935, **33**, 446.
[6] *J. Endocrinol.*, 1939, **1**, 56.

that hypophysectomy in the rat results in a complete cessation of endochondral bone formation. The epiphyses are closed soon after the operation and longitudinal growth of bone ceases. These results are readily detected by taking radiographs of the tail of the operated rats. This procedure, in fact, offers a simple method of assay of the growth factor, since administration of the active extract immediately after the operation leads to normal growth of bone, and the authors claim that measurement of the tail length of the rat is a more consistent index of growth than that afforded by the weight measurements at present used. If the administration of the hormone is delayed until the epiphyseal closure is complete it is no longer effective. The changes after hypophysectomy exactly resemble those seen at the normal time of cessation of growth, but do not, however, affect the development of membrane (or desmal) bones such as those forming the skull. From these assembled facts the authors conclude that the terms "growth hormone" and "chondrotrophic hormone" are synonymous. Included in the paper is a series of photomicrographs of the effects of hypophysectomy and replacement therapy on the epiphyseal cartilages of growing rats. They provide convincing evidence of the chondrotrophic activity of their extract, but it would appear that there must be other factors at work in the pituitary control of growth since it would be hard to explain the changes in the facial bones found in acromegaly on a purely chondrotrophic hypothesis. Perhaps these changes are the result of an indirect action through one of the other endocrine glands. Such a theory would nicely synthesize the rival views on the nature of the growth potency of the anterior pituitary. But such speculation is at present premature, and there is obviously scope for more experimental work before the physiology of the endocrine control of growth is fully understood.

CLEIDOCRANIAL DYSOSTOSIS

The combination of defects in the clavicles and cranial malformation was clearly recognized in 1897 by Pierre Marie and M. Sainton, though Prochaska gave a suggestive description as early as 1862. To date about 250 cases have been reported, and the recent literature shows that the condition is more widespread than the early reports suggested and that the syndrome is of a hereditary character. Isolated cases are still being reported in families otherwise free from the condition, and it is believed that dominance of low penetrance is the underlying hereditary factor in these cases, though one report, that of Fredbärj, suggests that the condition may occasionally be recessive. Most of the fully studied cases show a clear Mendelian dominance. This is brought out by two recent studies: one by Debré, Lamy, and Sée,[1] in which the defect is traced over four generations, and the other by O. H. Kahler,[2] in which it is traced over six. The earlier theories ascribing the syndrome to intra-uterine inflammation or to mechanical intra-uterine disturbances are no longer held. It is now recognized that it is hereditary and also that it is not merely a disturbance in membrane bones. The dwarfing of stature, which is a constant feature, is indicative of the widespread character of the disturbances. Indeed, a whole series of anomalies have been reported as more or less constant associations. The pelvis appears to be almost invariably affected. The os pubis is often absent or rudimentary, and various structural changes in the other pelvic bones have been observed, including malformation of the hip-joint, occasionally giving rise to unnatural mobility of the lower limbs similar to that seen in the upper limbs from an associated malformation of the shoulder-joint. Changes in the jaws such as prognathism are common, and dental anomalies ranging over delayed eruption, dysplasia, and malposition have been observed. The spine is involved in lesions ranging from scoliosis to spina bifida occulta. While the latter condition is common, no case of overt spina bifida has been observed. In the extremities stunting of the terminal phalanges is not uncommon. Neurological symptoms suggestive of syringomyelia were present in the first case of Pierre Marie, and similar findings have been reported since. Debré, Lamy, and Sée regard mental dullness as part of the syndrone, while Kahler holds that the low intelligence of patients affected with cleidocranial dysostosis must be regarded as due to social selective agencies, falling upon a family heavily affected with markedly unaesthetic defect. As in most syndromes, all the components are not necessarily seen in the same patient, so much so that even one of the two predominant features—the clavicular and the skull defect—may be absent. Furthermore, the range of changes in the clavicles or in the skull bones is considerable, though interfamilial variations are slight. In the clavicles the defect may range from total absence to fragmentation, and it may be unilateral or bilateral, symmetrical or asymmetrical. Other shoulder-girdle bones may also be involved to varying degrees. The skull defect is generally characteristic and consists of a striking disproportion in size as between the face and the vault; frontal bossing is common, occasionally exaggerated by a marked furrow in the mid-line. Owing to disturbed ossification of the bones of the vault the fontanelles may remain open even in adult life. Brachycephaly is practically constant, and hypertelorism is reported in one of the cases by Debré and his associates. The recognition of the genetic character of cleidocranial dysostosis, the widespread changes observable, and the strong similarity to such affections as hypertelorism, Crouzon's syndrome, and other conditions with widespread lesions raise the question of the relation of this particular syndrome to the many others of the same type. This is all the more pertinent since all syndromes appear in partial forms and the familial "stamp" is a defining factor in the changes seen in any particular group. This only emphasizes the importance of recognizing unusual anomalies as an object worthy of study for reasons other than mere scientific curiosity. The synthetic view that will ultimately emerge on the nature of hereditary anomalies can only come from the steady accumulation of these isolated observations.

[1] *Ann. Méd.*, 1939, **46**, 5.
[2] *Z. menschl. Vererb.-u. Konstitionslehre*, 1939, **23**, 216.

VITAMIN DEFICIENCIES AND MOUTH LESIONS

With a view to clearing up the many conflicting statements on the causes of the periodontal diseases—gingivitis, chronic, subacute, and acute Vincent infections, and pyorrhoea alveolaris—Topping and Fraser[1] have carried out certain nutritional experiments on monkeys. A diet was devised which was short of vitamin A, almost completely lacking in the vitamins B_2 (complex) and C, and totally lacking in vitamin D. Supplements of all the vitamins but the one under test were given with this diet to the different groups of monkeys. One further group of eight animals was given all the supplements, and another four animals were given a general stock diet for comparison with the group given the vitamin-free diet plus all supplements. The experiment was carried on for 210 days or as long as the animals lived. The monkeys of the control groups on the stock diet lived for the full period of the experiment and were almost completely free from lesions of any sort, one monkey only developing a mild localized gingivitis, which subsided to the mild chronic form. Two of the monkeys fed on the experimental diet plus all supplements had no oral lesions, four others had very slight lesions which cleared before death, and one developed chronic gingivitis. Only three of the group survived the 210 days of the experiment. Of the four monkeys receiving no vitamin A (but given all the other supplements) one survived the experiment. (The cowpeas of the diet contained a little vitamin A). Two of them developed a chronic gingivitis, present at the time of death. None of the four animals receiving no vitamin D survived the period of the experiment; two of them developed a slight gingivitis and two a gingivitis which proceeded to necrosis of some of the interdental papillae and finally to a slight generalized necrotic gingivitis. None of the monkeys deprived of vitamin C lived to the end of the experiment. Three of them contracted a severe gingivitis and the other a mild form. The results of the deficiency of the B_2 vitamins were less clear. None of sixteen animals (four groups of four animals each) survived the 210 days of experiment no matter which parts of the B_2 complex had been given. All suffered from a severe watery diarrhoea and in many some anaemia was associated with a moderately severe leucopenia. Twelve of the sixteen developed gingivitis, eleven necrosis of interdental papillae, ten generalized necrotic gingivitis, and six ulcerative lesions in the buccal or labial mucosa. Three progressed to complete gangrenous necrosis of the cheek similar in appearance to the lesions described in human beings as noma. Neither nicotinic acid nor flavin, nor both together, prevented the ulcerative lesions. Histological examinations of the appropriate tissues of these animals made by Tomlinson[2] confirmed and amplified the macroscopical findings. Thus all of the deficiencies investigated, whether of vitamin A, the vitamin B_2 complex, vitamin C, or vitamin D, resulted in necrosis of the periodontal tissues and oral mucosa, though it was probably the greatest in the B_2 deficient groups.

[1] *Publ. Hlth. Rep.*, Wash., 1939, **54**, 416.
[2] Ibid., 431.

AN AID POST IN LONDON

A visit to an aid post in London under the guidance of the medical officer in charge was a useful lesson in organization and preparedness. This aid post has been established in the premises of an evacuated hospital. It includes a store room in which not only is everything in its place, but, what is equally important in these circumstances, the place of everything was plainly labelled in unmistakable lettering on shelf or cupboard, so that should some exigency call away the usual guardian any newcomer could instantly lay hands on what was wanted. Here were a hundred things to meet every possible contingency—blankets, buckle straps, triangular bandages, tourniquets, sanitary towels, dressing gowns, decontamination wraps, picric acid dressings for burns, wool swabs, gauze dressings, also such things as soda, soap, candles, matches, medicinal tumblers, safety lamps such as miners used to carry, various instruments—in fact, the A to Z of first aid. Even a pile of old newspapers was included, this being the best ready-to-hand material for absorbing any pool of blood. A blackboard on its easel announced, among other memoranda, what few materials had been requisitioned and not yet supplied. The whole ritual of the treatment of a casualty has been thought out from reception to discharge. The cases will be received at an entrance which has a double air-lock (although gas-masks will still be necessary on account of the impossibility of sealing such a building completely against gas) and taken to treatment rooms so arranged as to necessitate the minimum of travel. Stretcher cases and walking cases are separated and brought together again as seems most suitable. A conspicuous feature was a central table laid out with all the necessary instruments, dressings, and utensils for emergency surgery, the whole being covered by cellophane stretched on a box frame so that it could be lifted off instantly without disturbing any article. After haemorrhage has been arrested, pain relieved, and any other immediate treatment given, the patients will go to a large and pleasant rest room, equipped with beds, couches, and deck chairs. Afterwards, near the exit, with the registrar in attendance, the cases will be cleared, those with only slight injuries or perhaps having suffered only from nervous shock being sent to their homes, while others will be sent to the casualty hospital, which is one of the principal London hospitals not far away, and others again to the base hospital of the sector down in the country. The small staff of nursing, nursing auxiliary, and ambulance personnel, all well drilled and instructed, with an evident spirit of comradeship and pride in efficiency, relieve the tedium of waiting by exercises in which dummy casualties, both walking and stretcher cases, are used. Special attention has also been paid to the staff recreation room and kitchens. The function of aid posts, of which there may be two thousand in this country, is to save the casualty hospital from a rush of minor and ambulant cases and to provide early treatment in districts where the hospital is at some distance. It is important for the public to have confidence in these posts. They may well have a key value in dealing with the results of air attack.

WAR WOUNDS AND AIR RAID CASUALTIES

The following article is a supplement to the series of lectures on war wounds and air raid casualties printed in these columns

ORGANIZATION OF THE EMERGENCY MEDICAL SERVICES*

I. HOSPITALS

BY

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In time of war hospitals and other buildings or private houses which may be used as hospitals, come under the general direction of the Minister of Health. Existing hospitals will, however, continue to be administered by their own governing bodies, while premises used as hospitals will be administered either by one of the larger local authorities or by a neighbouring hospital.

Classification of Hospitals

Hospitals have been classified into three categories: Class 1, institutions which are capable of giving full surgical treatment; Class 2, institutions, such as Poor Law institutions and convalescent homes, which are capable of providing reasonable nursing facilities; and Class 3, infectious diseases hospitals. Class 1 has again been divided into (*a*) hospitals of over fifty beds, and (*b*) hospitals of under fifty beds. Separate wings or wards of mental hospitals are also being used, and may be graded as Class 1 or 2, according to the facilities available. The few existing Service hospitals will, as far as possible, be reserved for Service cases, though wounded civilians will be taken in if necessary for temporary shelter pending removal to a civilian hospital. Service casualties will also be treated in civilian hospitals.

Many Class 2 hospitals are being upgraded to the status of Class 1 by the provision of operating theatres and equipment, while certain selected hospitals in safe areas are being expanded by the provision of extra beds and by the erection of huts, each calculated to take forty beds. Structural improvements and alterations are being made in many of the buildings, and additional sanitary and cooking facilities provided where required to enable them to cope with an increased number of patients. These adaptations and temporary fittings are not of the standard usually found in first-class hospitals; but, if not elaborate, they at least enable first-class work to be done without throwing too great a strain on the medical and nursing staffs. The cost of the adaptations is being borne by the Ministry—in voluntary hospitals up to 100 per cent. and in publicly owned hospitals up to 70 per cent., with a maximum liability on the local authority of one-tenth of a penny rate. Full particulars of the whole scheme are given in an official publication of the Ministry of Health, Memo. No. 2, which can be obtained from the Stationery Office or through any bookseller.

Many country houses have been offered to the Government, as in the last war, but with a few exceptions they have not been accepted owing to the difficulty of adapting them for acute surgical work and of providing skilled staff. If the war lasts for a long time, and if many of the towns continue to be unsafe for habitation after the first few months, no doubt accommodation for convalescent cases would have to be found. But that is a problem which can be met when it arises. The accommodation required for civilian casualties is very different from that necessary for the combatant services, which are under an obligation to house and keep their personnel, preferably in disciplined units, for as long as they remain in the forces. A convalescent civilian casualty can be discharged to his own home, to the care of his friends, or to a billet if he has no home to go to, as soon as he is no longer in need of in-patient hospital treatment.

Certain hospitals or parts of hospitals, suitably staffed, have been set aside for the treatment of such conditions as jaw injuries, nervous troubles, and other cases requiring specialized treatment. Probably a very high percentage of all casualties will be classified as orthopaedic, and at first will have to be admitted to any surgical hospital, though in time special types of case will be transferred to the care of surgeons with specialized experience. Maternity wards or hospitals, and infectious diseases hospitals, with one or two exceptions, will not be used for the reception of casualties. In country districts where a large increase in population is expected many of them are being expanded by the authorities responsible.

Distribution of Patients

Although in practice it is impossible to protect a hospital completely from the effect of air raids, some form of protection can usually be provided. Memorandum E.M.S. No. 1 of the Ministry of Health makes detailed recommendations of the precautions which should be taken and the terms under which financial help will be given. No one can foresee with any certainty where casualties may occur, but while every suitable hospital is expected to take in and provide temporary shelter for persons injured in its immediate neighbourhood, permanent treatment will only be provided in those hospitals which experience shall show to be reasonably safe. For this purpose most of those in the larger towns have been grouped or affiliated with those in the surrounding country, to which their cases, and if need be some of their staff, will be transferred.

The essence of the scheme is fluidity, and it may well happen that patients will have to be moved either by road or rail for comparatively long distances. Ambulance trains, with a carrying capacity of over 10,000 stretcher cases, will be formed by converting brake vans to take stretchers by means of special fittings, which have already been manufactured and stored. One of the advantages of central control is that there is no rigid line of demarcation between one district and another, and patients may be treated wherever suitable accommodation is available.

Administrative Personnel

The Director-General of the Emergency Medical Services and his staff at the Ministry of Health are supported by "Consulting Advisers"—leading physicians and

* This article was written before the outbreak of war, and the arrangements described in it are now in force without material alteration.

surgeons representing all aspects of professional work, appointed on the advice of the Presidents of the Royal Colleges of Physicians and Surgeons. A Matron has also been appointed. For purposes of administration a whole-time medical officer, known as a "Hospital Officer," has been stationed in each of the eleven Civil Commissioners' Regions into which England and Wales have been divided. He in turn is assisted by the medical officers of the counties and county boroughs in his region, who act as his agents in their own respective districts. In some of the larger centres of population the Hospital Officer is also assisted by a leading medical man of the district known as a "Group Officer," who is primarily concerned with matters of staff, professional treatment, and the allocation of hospitals for specialized work in the grouped or affiliated hospitals of that town and the surrounding country.

Hospital Administration in London

The complex system of local government in London does not lend itself to the control of hospitals over a sufficiently wide area, and consequently London is administered somewhat differently. Greater London has been divided into ten sectors, each radiating from a centre at which is one or more of the great teaching hospitals. These sectors contain many widely different types of hospital and extend well into the surrounding counties. The Hospital Officer for London is assisted by a Group Officer in each of these sectors, appointed on the recommendation of what may be termed the "parent" teaching hospital of the sector. The Group Officer works from a Sector Office situated at the outskirts of the sector. Under the Hospital Officer he is responsible for the movement of patients within his sector, as well as for matters of staff and treatment. He in turn is supported by a sector Matron to advise on the distribution of nursing staff and by a sector lay officer for non-professional work.

In London, central hospitals at the apex of the sector have been reduced in size and will be used for little more than the temporary reception of casualties. Patients are to be transferred at first with the utmost speed to what may be termed advanced base hospitals on the fringe of London and eventually to large base hospitals well clear of it. Much of the valuable *x*-ray and other therapeutic equipment in the central hospitals is also to be moved out to safer hospitals at the earliest opportunity.

War-time Medical Appointments

The war will be accompanied by big changes in the distribution of population, resulting not only from the Government's evacuation scheme but from the increased demand for labour of all kinds in different parts of the country; medical practice must adapt itself to the altered conditions. The demand for doctors will be increased, but the official use made of their services must be determined by the situation as it changes. The staffs of hospitals in areas which prove to be untenable must of necessity be transferred elsewhere, while the staffs of safer hospitals will have to be augmented, either by using part-time medical men in the neighbourhood or by the appointment of whole-time resident physicians and surgeons. Mobile surgical teams and other visiting specialists are being appointed to cover particular areas.

These arrangements are being made by the hospitals themselves on the advice of the Hospital and Group Officers and with the approval of a Central Emergency Committee of the British Medical Association, which acts under the authority of the Ministry of Health and is representative of all sections of the medical profession. The headquarters of this committee is at B.M.A. House, Tavistock Square. The committee has in turn formed Local Emergency Committees representing the profession in various centres. It has prepared a register of practically all the doctors in the country, with particulars of their qualifications and experience. Rates of remuneration for whole-time and part-time service have been fixed by the Ministry after consultation with the British Medical Association and other representative bodies. They approximate to the rates paid by the fighting services, so there will be no great financial difference between appointments to civil or military work. Most whole-time appointments are at the rate of £550 a year with board and lodging, which is approximately the pay of a captain in the R.A.M.C.; men appointed to senior posts, such as hospital superintendents or specialists in charge of a medical or surgical division, receive much the same pay as they would for similar posts in the Army.

The function of the Central Emergency Committee is to supply the professional personnel required for the medical administration of the country as a whole, including that of the fighting services, as circumstances may prove to be necessary. Its organization is designed to take into consideration personal factors, for which local knowledge is required. Until called up for service in one capacity or another, medical men should remain where they are and continue with their ordinary work; if they change their address they should keep the Central Emergency Committee informed in their own interests. A Central Emergency Committee for Nursing, with headquarters at Romney House, Marsham Street, London, S.W.1, has also been formed. The supply of hospital nurses is being greatly augmented by the Civil Nursing Reserve, which consists of trained nurses and assistant nurses not at present serving in hospitals, or as district nurses, or in public health work, and of nursing auxiliaries, who are now being recruited and trained.

Stores and Equipment

Vast quantities of hospital stores and equipment are being manufactured, and some 100,000 casualty beds, with the necessary bedding and ward equipment, have been issued to selected hospitals. All hospitals have been asked to keep a month's supply of expendable stores in hand, and they will draw their supplies direct from their own suppliers, as in times of peace. Large reserves of drugs and dressings have also been accumulated in various parts of the kingdom to meet any unforeseen shortage, or for use when transport arrangements may be difficult and uncertain.

Local authorities are being encouraged to develop and expand whatever blood transfusion services exist in their district. In London the Medical Research Council has arranged for the establishment of a series of depots or empanelling stations for the registration and testing of donors. These donors will be asked to attend the nearest depot as soon as their services are required. Large quantities of blood, which will keep for some three weeks, will be collected and stored under suitable conditions.

Finance and Transport

Rates of payment by way of advances have been worked out by the Ministry of Health and the British

Hospitals Association pending a review of the cost of providing these services, but it is agreed that additional temporary financial assistance may well have to be provided. A war of long duration and the consequent drying up of voluntary subscriptions may well cause serious financial embarrassment to institutions depending on charity, a position of which the Government is fully aware. It is not, however, possible in an article of this kind to discuss the many financial difficulties which will affect all hospitals in time of war.

No hospital scheme would be complete without adequate transport. In every district there will be fleets of ambulances consisting of single-deck passenger buses specially fitted for the carriage of stretchers. Most of them will be able to take from eight to ten lying cases. They will operate between the hospitals or between hospitals and trains, and are not intended for the collection of casualties in the street, for which smaller commercial vehicles are being used, usually adapted to take two or four stretchers.

Preparatory Measures

Every hospital included in the Ministry's arrangements knows at the outbreak of war of the part it is expected to play. As many patients as possible will be sent home, and about 100,000 beds will be freed in twenty-four hours. Additional beds will be put up in the wards, most of them being supplied by the Government, and beds will be installed in spare accommodation not now used as wards—to provide another 100,000 beds. In certain towns where by these means alone enough beds might not be made available for the immediate reception of casualties, a selected number of patients will be moved by ambulance or train to other institutions in safer areas pending their recovery and discharge. In the course of time certain hospitals may be freed entirely for acute work by the transfer and concentration of chronic sick elsewhere. Such arrangements are far from ideal and will seriously inconvenience the smooth running of the institutions concerned. But beds have to be found. No one can foretell the extent of the casualties from enemy raids or service over-seas or the extent to which beds for ordinary sick may be required for the civil population, many of whom will be living away from home. Although huts are being added to more than 100 hospitals and institutions in order to provide some 40,000 new beds, and one or two entirely new hospitals are to be built in districts where there is a pressing need, these new beds alone might be unable to cater for the increased demand. Every institution must then be prepared to strain its existing accommodation to the utmost at least in the first few months of war. There is reason to believe, however, that most hospitals fully realize their responsibilities and are fully prepared to suffer whatever sacrifices may be necessary to ensure a final victory.

Estimation of Mucus.—After homogenization of the material by sodium hydroxide the mucus is precipitated by acetone from the trichloracetic filtrates of gastric juice, saliva, or sputum. The precipitate is then dissolved in diluted sodium hydroxide and adjusted to *p*H 6.8. Finally, the iodine bound by the mucin is estimated in the presence of methylene-blue. Standard solutions of mucus previously prepared by the same method and purified by dialysis and electrodialysis are used for comparison. The estimation is not affected by the presence of pseudomucin from the bile or by proteins contained in the fluids examined.—Quantitative Method for estimate of Mucus in Gastric Juice, Sputum, and Saliva. J. Glass.—*Arch. Mal. Appar. dig.* May, 1939, **29**, 508.

THE EXAMINING BOARD IN ENGLAND

Royal College of Physicians of London and Royal College of Surgeons of England

L.R.C.P., M.R.C.S. REGULATIONS, EXAMINATIONS, ETC.

In consequence of the outbreak of hostilities the Committee of Management of the Examining Board in England has authorized the following arrangements and modifications in the regulations for the L.R.C.P., M.R.C.S., which will be effective until further notice:

I. *Pathology and Bacteriology: Section I. of the Final (Pathology Bacteriology) will be discontinued.*—Candidates who have already passed Section II (Medicine, Surgery, and Midwifery) should communicate in writing with the Secretary of the Board, stating the date at which they passed in the last subject, so that arrangements may be made for their names to be submitted to the Royal Colleges, so that they may be granted the diplomas of L.R.C.P., M.R.C.S.

II. *Admission to the Final L.R.C.P., M.R.C.S.*—(i) Candidates will be allowed to *complete* the examination on producing evidence of having completed thirty months of clinical work, subsequent to passing in anatomy and physiology, provided that all the specified appointments have been held. (ii) Candidates who have completed twenty-four months of clinical work, subsequent to passing in anatomy and physiology, will be eligible for admission to *one* or *two* subjects of the examination. (iii) The regulation requiring the whole of the Final Examination to be completed within a period of twenty-five months is suspended.

III. *First Examination.*—It is expected that the First Examination (anatomy, physiology, materia medica, and pharmacology) will begin on or about Wednesday, October 18. Further particulars, when available, will be sent to those who have already entered—or who may enter—for the examination. Candidates will be eligible for admission to Part I (anatomy and physiology) on producing evidence of forty-six weeks' study in anatomy—including dissection of the entire cadaver—and physiology, *all of which may be completed within a period of twelve consecutive months.* Owing to the unavoidable postponement of the examination from the date originally published, entries will be accepted *up to the first post on Wednesday, September* 27.

IV. *Pre-Medical Examination.*—It is expected that the Pre-Medical Examination (chemistry, physics, and biology) will begin on or about Monday, October 23. Further particulars, when available, will be sent to those who have already entered—or who may enter—for the examination, not later than first post on Monday, October 2.

V. *Postgraduate Diplomas.*—The examinations for the Diploma in Child Health and for the Diploma in Public Health due to begin in September and October respectively are postponed for the present. Further information will be published as soon as it is available.

VI. *Candidates for All Examinations* must be prepared to be examined outside London if necessary.

VII. *Administration.*—The offices of the Board will be open from 9 a.m. to 4 p.m. daily from Monday to Friday (inclusive) and will not be opened on Saturday.

HORACE H. REW,
Secretary, the Examining Board in England.

ROYAL COLLEGE OF SURGEONS OF ENGLAND

F.R.C.S.—(1) The final examination for the Fellowship will, it is expected, begin on November 9, as advertised. (ii) The primary examination for the Fellowship will, it is expected, begin on December 4, as advertised.

L.D.S.—(i) The final examination for the Licence will, it is expected, begin on October 27, as advertised. (ii) The first examination for the Licence advertised to begin on September 20 is postponed for the present.

Notice to All Candidates.—Further particulars concerning the arrangements for the conduct of the above examinations will be notified, when completed, to candidates who enter for the examination by the appointed dates.

HORACE H. REW.
Director of Examination, Royal College of Surgeons of England.

A HEALTHIER NATION

TWENTIETH ANNUAL REPORT OF THE MINISTRY OF HEALTH

The Ministry of Health, which was created just after the end of the last war, issues its twentieth Annual Report[1] in the early days of the present one. The report was, of course, compiled before war broke out, and now the new section, on civil defence, which only occupies a few pages, seems to have spread itself over the whole field. The many other matters which the Ministry has to deal with, including housing and town planning and international health work, sound like the echoes of a just vanished world. The section on civil defence consists only of two chapters, one on medical services, including A.R.P., and the other on evacuation, and does no more than recite arrangements which are by now only too familiar. The Minister of Health in a foreword says that there is no one who does not deplore the necessity for these developments, but they are likely to take their place as permanent additions to the list of public social services.

Vital Statistics: Records Broken

From the general body of the report one gathers the impression of a healthy nation. Judged by almost every standard, the health of England and Wales is on the upgrade. Not only the conquest of disease but the achievement of positive health was never so evident as at a moment when the energies of men are bent on mutual destruction. The Minister mentions that in eight urban and rural areas taken at random the average weight of the elementary school children at the age of 12 has increased by three pounds and the average height by half an inch as compared with a group of similar children ten years ago. The same tendency is shown in the results of the medical examination of young men under the Military Training Act; nearly 83 per cent. of the first batch were passed as Grade 1.

To take the crudest basis of all, the death-rate has again fallen and now stands at 8.5 per 1,000 population, the lowest figure on record, just half the rate which obtained in 1901. Infant mortality sets up a new low record of 53 per 1,000 births, little more than one-third of what it was in the first year of the present century. Maternal mortality in 1938 was less than 3 per 1,000 births; only five years ago it was 4.4. Tuberculosis took its smallest toll. There were only half the number of deaths from tuberculosis in 1938 that there were in 1911. In Wales, although the notifications were slightly increased, the deaths from tuberculosis (812 per million of the population) were the lowest recorded; the number was round about 1,000 ten years ago.

As against this there has been a rise in the mortality from cancer. The deaths last year from cancer numbered 68,605, about 1,600 more than in the previous year. The passage of the Cancer Act, says the Minister, represents a particularly important extension of the social services. Investigations carried out at the Ministry have shown that in spite of recent developments in cancer therapy a large proportion of persons suffering from cancer who could benefit from treatment if it were given sufficiently early either do not receive the treatment at all or receive it under conditions or at so late a stage in the disease that cure, or even temporary relief, is impracticable. Moreover, there is lack of accommodation at hospitals possessing adequate facilities for all forms of treatment. It is hoped that the Cancer Act will be a means of securing improved facilities.

Control of Infectious Diseases

The report gives a particularized account of the principal administrative measures which are adopted in this country for the control of infectious disease—namely, notification, isolation, disinfection and supervision of contacts, together with the increasing use of immunization. An examination of the records of the incidence of the principal infectious diseases and of the death-rates therefrom suggests that much greater progress has been made in the control and eradication of environmental diseases than of what may be called "personal" diseases. Cholera, typhus fever, and plague, all environmental diseases, have virtually disappeared, and the death-rate from the enteric group has been substantially reduced. On the other hand, the position is not so satisfactory with regard to the personal diseases. The number of cases of diphtheria fluctuates from year to year with no indications of any general decline. There are about 3,000 deaths in this country from diphtheria every year, and there has been little variation in this figure since the last war.

It is interesting to note that, as the report states, although there is no material decrease in the incidence of influenza, measles, and whooping-cough, there has been a fall in the death-rate per 1,000 population from these diseases, as is shown by a comparison of the figures in the last completed decade with those for 1938.

	1921–30 Average	1938.
Influenza	0.369 ..	0.118
Measles	0.109 ..	0.040
Whooping-cough	0.114 ..	0.027

Last year eighteen cases of small-pox were notified, divided equally between variola major and variola minor, and there were three deaths, the first deaths from small-pox to occur in this country since 1934. An exceptionally large number of cases of poliomyelitis were notified in 1938—namely, 1,489, almost twice as many as in the year before. All parts of the country were affected, though the increase over the normal incidence was less noticeable in the northern and south-western parts of England. Seven suspected cases of psittacosis were brought to the notice of the Ministry, and five gave positive results to specific tests.

Maternity Services

The most satisfactory pages in the report are those which relate to maternal welfare, the more so because the figures reached do not appear to be fortuitous but to reflect a stable progress likely to be substantially maintained. The progress may, of course, be hindered by the difficulties inevitably attending the evacuation of expectant mothers from town areas, bringing in complications as regards the midwifery service and accommodation in lying-in institutions. The mere fact that mothers may be prevented from having a midwife previously known to them may act adversely in some cases. But, as it is, the reduced rates reflect the increased attention which is now given to the ante-natal supervision of mothers and their own greater readiness to benefit by such supervision, also the improved technique resulting from the extension of scientific knowledge, the advance in organization of the maternity services, and the better social care of mothers. The advances in these and other fields have in turn been quickened and invigorated by the intensified efforts of all concerned to meet the call for safer motherhood. It all shows what can be done when a subject gets into the conscience of the community.

The number of ante-natal clinics increased during the year to 1,676, and the number of mothers attending to 365,000, which is considerably more than half the total number of confinements. Reference is made to the services set up under the Midwives Act, 1936. Some of the immediate practical issues with which the authorities have had to deal are the organization of reliefs, the arrangement of off-duty times in such a way as to secure reasonable regularity on the one hand, and on the other to prevent the care of an individual mother passing from midwife to midwife, also the best placing of midwives so as to afford a ready and efficient service, and the allocation of cases between them.

Insurance Practice

The nation is said to be happy which has no history: the medical service under the National Health Insurance Act will soon be in the same position. Here is a service which in

[1] H.M. Stationery Office. Cmd. 6089. (5s. net.)

England gives entitlement to nearly 17 million persons to be attended by over 16,000 doctors, and in Wales not far short of a million to be attended by over 900 doctors, and yet the number of cases in which complaint is so serious and well substantiated that remuneration has had to be withheld is only eighty-six (only two in Wales), and most of these were cases of failure to keep records or furnish information or were infringement of the medical certification rules. Negligence was found proved in only twelve cases. As for excessive prescribing, there were only five cases in England and none at all in Wales in which disciplinary action was necessary. There was also a decrease in the number of chemists against whom breaches of terms of service were found proved.

The Ministry of "Health" is really an insufficient title. One-third of this report, for example, is taken up with matters which cannot be described as having a direct bearing on the health of the community: these include public assistance, pensions, housing, and local government organization and finance. In all these fields a great amount of information is afforded, and there are statistics enough to entertain statisticians on black-out evenings. Questions of water supply and sanitary services do, of course, vitally affect public health, and so does the considerable work the Ministry undertakes on the analysis of food and drugs. Out of about 150,000 food samples taken during the year, 8,433 were found to be adulterated, but it should be added that in many of these cases it was a question of contravention of some formal requirement rather than of unsatisfactory composition. The largest percentage of adulterated samples were of vinegar!

PROBLEMS OF HUMAN HEREDITY

INTERNATIONAL GENETICAL CONGRESS AT EDINBURGH

[FROM A CORRESPONDENT]

The seventh International Genetical Congress was held at Edinburgh from August 22 to 30. This important congress is only held every five years, a fact which no doubt accounted for the surprisingly large number of foreign delegates who attended in spite of the uncertainty of the international situation during the closing days of last month. The only European countries not represented at the opening of the Congress were Russia, whose large delegation cancelled its visit a few weeks previously, Spain, and some Baltic States. At the plenary session on August 23 Professor F. A. E. Crew of the Chair of Animal Genetics at Edinburgh was elected president in place of Professor Vasilov of Russia, and an address of welcome was given by Professor Sir Thomas Hudson Beare.

Blood Groups

One of the meetings of the Section of Human Genetics was devoted to a discussion of blood groups. Few "normal" characters in man are so completely independent as are the blood groups of environmental influences and of age and sex, and follow such a comparatively simple mechanism of inheritance. It has long been known that the four types, O, A, B, AB, represent the possible combinations of two of the three genes O, A, and B, which form a series of triple allelomorphs, and that the types of M, N, and MN are likewise based on the possible combinations of the two allelomorphs M and N, which are localized in a chromosome different from that of the former group. However, according to recent investigations, by means of highly sensitive serological methods, this system appears to have become slightly more complicated. V. FRIEDENREICH described character "A" as comprising at least three forms, differing chiefly quantitatively and depending upon three different allelomorphic genes. A_1 is dominant to A_2, and A_2 dominant to A_3, A_3 being very rare. Similar findings have been obtained for the MN system, as cases of rare forms of the characters M and N have recently been reported, one of which, N_2 seems to depend upon a particular allelomorphic gene. These results may become important, as they will allow a more detailed investigation into the distribution of various types of blood groups among different races. As is well known, this distribution is characteristic, although contrary results have been sometimes obtained. However, as G. L. TAYLOR and A. M. PRIOR pointed out in a statistical examination of the published figures on the distribution of the M and N factors in random samples of different races, the discrepancies found are probably due to the use of faulty technique, as the data obtained by a large number of experienced writers are in agreement with the genetic theory of Landsteiner and Levine.

There appears to be a real heterogeneity between races with regard to the proportion of M and N genes, but not with regard to the heterozygotes, MN. R. RUGGLES GATES, discussing the distribution of the ABO group among various races, pointed out that it is generally believed that O is the primitive condition, whereas A, and later B, have appeared as mutations. The evidence of their distribution is strongly against any theory of selective action. This would agree with the fact that it seems to be difficult to find any connexion between a particular blood group and a defect or derangement of negative selective value. That some recent attempts have been made in this direction, however, was shown in a paper contributed by T. A. MUNRO, L. S. PENROSE, and G. L. TAYLOR on linkage between the genes for phenylketonuria and the ABO allelomorphs, and by D. J. FINNEY on linkage between these allelomorphs and allergic diseases.

Inheritance of Abnormality

Considerable interest was shown in the studies of inheritance of abnormality. In agreement with Dahlberg's statement that the frequency of monozygotic twinning is constant at all maternal ages while that of dizygotic twinning is dependent on maternal age, R. L. JENKINS and J. GWIN, in an analysis of the interrelations of the frequencies of plural births, based on a material of 25 million births in the U.S.A., showed that the frequency of monozygotic triplets is constant, being independent of maternal age, while the frequency of dizygotic triplets (regarded as representing the simultaneous occurrence of monozygotic and dizygotic twinning) is a function of maternal age. The latter, they found, also applies to trizygotic triplet births. The operation of abnormal features among relatives was examined by DOUGLAS MURPHY in a study of 890 families with congenitally malformed children, and by R. J. A. BERRY in an investigation into the mental status of the parents of 1,050 mentally defective persons. A further step in this work on the inheritance of abnormality would be to try to fit the results into a scheme of Mendelian inheritance. For this purpose family studies, often combined with twin studies, are used. Thus I. LUNDHOLM, using Dahlberg's "later siblings" method, was able to conclude that hypochromic anaemia is caused by one dominant gene which, according to this hypothesis, causes some abnormality in the digestive tract resulting in a decreased power of resorbing iron. In most cases the disease does not manifest itself unless there is a loss of iron through bleeding; thus it is always evident in women who have the gene, but it only appears in men after bleeding has been caused by some defect.

In a study into schizophrenia, based on a material of 500 pairs of twins and their families, F. J. KALLMANN came to the conclusion that the schizophrenic type is specific, autosomal, and probably monogenic-recessive, showing a penetrance of 75 per cent. K. THOMASSON, in an investigation based on 860 cases, found that nothing definite can be stated at present regarding the hereditary mechanism of manic-depressive psychosis, and that it may even not be considered hereditary at all. A reason why the results of various investigators may appear to be contradictory is the fact that clinical units often fail to be genetical units. Hence some investigators, like Frets in his study of families with feeble-mindedness, have turned to the "biographical" method, which means that they tend to collect only a few cases, but that they examine the families of these with more care than has been done before.

J. A. FRASER ROBERTS in his family studies came to similar conclusions with regard to feeble-mindedness. Determination of level of intelligence to the extent that it is hereditary is essentially multifactor, as is stated by the same author in his paper on resemblances in intelligence between sibs selected from a complete sample of an urban population. Most of the high-grade defectives fall at the minus end of what may be called the normal continuous range of intelligence. The low-grade defectives apparently are determined in a different way, and are, genetically, a very heterogenous type. In the majority of cases they carry one gene, out of a number of genes, which determines an abnormal susceptibility to influences in development. Unfortunately, not only do all these genes produce indistinguishable results, but the effect of one single gene is sufficiently susceptible to other influences to yield a variety of clinical types. It is hoped that as a result of such studies further progress will be made in the isolation of types both clinical and genetic, and that a genetical analysis as complete as possible for each unit will be carried out. So far this aim has been reached only in the case of some of the rarer diseases, as was shown by P. J. WAARDENBURG in a contribution concerning dominant X-chromosomal inherited eye defects in man (dystrophia retinae pigmentosa and extraocular nystagmus), and by BARBARA BURKS, who was able to present the first case of autosomal linkage found in man, a linkage between tooth deficiency and hair colour.

Origin of Tumours

However, genetical analysis has made little progress so far in the case of the most frequent diseases and those with a high death-rate, as the conditions appear to be complicated by the fact that the effect of the genes is apparently much modified by environmental factors. In these cases the first task would be to make a clean-cut statement of the respective roles of the two factors. This problem has become of such outstanding importance with regard to the origin of tumours, especially of malignant ones, that one section of the Congress dealt mainly with recent work done in this field. The methods used were either the twin method, by which the occurrence of a phenomenon is compared in identical twins (equal sets of genes, similar environment), and fraternal twins (different sets of genes, similar environment), or animal experiments.

New evidence which was brought forward proved beyond doubt the fact, already established, that the hereditary constitution of the individual is among the factors which determine its susceptibility to internal or external cancerogenous agencies. Of the two laboratory strains of mice kept by L. KREYBERG, the one developed tar warts after treatment of the skin much earlier than the other, and G. M. BONSER was able to establish by selective breeding a strain of mice in which benign and malignant tumours of the skin appeared especially early. H. B. ANDERVONT, testing eight inbred strains of mice, found wide variations in susceptibility to spontaneous, induced, and transplantable tumours. With the exception of spontaneous and induced lung tumours no correlation between susceptibility to the three types of malignancy was found. This later point was borne out by results reported by N. DOBROVOLSKAIA-ZAVADSKAIA, who found no relationship between the genetically determined incidence of spontaneous mammary tumours in various strains of mice and their response to chemical and physical carcinogenic agencies. In contrast to Andervont, however, she found no significant difference between the strains in respect of their susceptibility to external agencies. She therefore assumed that the appearance of the sarcomata and squamous-cell epitheliomata, which developed after treatment, depends pre-eminently on environmental factors. Certainly genetical and environmental factors have to interact when a tumour is to arise.

Studies by MADGE T. MACKLIN showed that hereditary factors are involved not only in the origin of a tumour in general but also in the determination of its type and the age of onset. Cases of monozygous twins indicate that "extrinsic factors play a part which may vary in importance in different types of tumours." H. LEMSER also reported on a case of monozygous twins, only one of whom suffered from a pituitary tumour with marked acromegaly. Once hereditary influences have been established for a certain kind of tumour determination of the type of heredity becomes the next step. Results are here still very scarce and contradictory, mainly owing to the complicated interaction of heredity and environment in the production of tumours. Only for epithelioma of the mammary gland, lung cancer, and leukaemia—all three in mice—ratios approaching simple Mendelian proportions have been found. For lung cancer there exists some evidence that it depends on the action of three or four Mendelian factors with an additive effect. Interaction of these factors with each other and possibly with further dominance modifying factors makes it difficult to decide whether their action is dominant, as claimed by Andervont, for spontaneous as well as induced pulmonary tumours, subcutaneous and transplantable tumours.

An interesting approach to the subject was discussed by P. A. GORER in a paper on transplantation and the differentiation of the malignant cell, in which he dealt with the so-called iso-immune reactions—that is, the defensive reactions released in animal tissue through normal or malignant grafts from an unrelated animal and leading to the destruction of the graft. These reactions could be shown to be elicited by genetically determined factors present in the grafter fragment but not in the host. Genetically obtained estimates of the number of factors for mammary cancer vary from one to ten. A reduction of this number through a critical analysis of the genetical data brings it more into line with the theory which assumes that the cancer cell is derived from the normal by a process of somatic mutation.

Selection in Human Populations

J. B. S. HALDANE discussed the various possible causes for natural selection. We know most about the type of selection which tends to eliminate rare mutants, as the lethal genes for amaurotic idiocy or the sublethal gene for haemophilia. Whereas in the case of lethal and sublethal genes dominants and sex-linked recessives are always near equilibrium, autosomal recessives are far below their equlibrium frequency; in consequence they are rarer in man than in most animals. The effect of selection on the occurrence of rare psychological defects was shown by G. DAHLBERG to be very small. According to Dahlberg the important thing is the breaking up of "isolates" (groups of people between whom intermarriage has taken place over a long period), which has no doubt brought about a large decrease of recessive defects in recent times. It was emphasized that the defectives are not very significant from the point of view of the population, provided that the average standard of the latter is good.

BRONSON PRICE, in some research carried out in Moscow from 1934 to 1936, found that in 260 families fertility correlated negatively with parental age at the birth of the first child, years of education, social status, and test intelligence. ENID CHARLES stated, with reference to Great Britain, that there was evidence that the decline in the birth rates originally began in the higher income groups at the end of the nineteenth century, but that the differences between the poorer and richer income groups were tending to disappear as reproduction rates fell below the survival minimum.

With regard to selection by sterilization of the unfit, it is worth remarking that most authors—for example, D. K. HENDERSON in a paper on eugenics and insanity—now emphasize the fact that the present sterilization laws in various countries can only have limited individual significance and racially are of no great importance. The view is maintained that the best type of eugenic programme is educational.

Since immunization against diphtheria was made compulsory in Poland three years ago the incidence of the disease has fallen in Warsaw, where 54 per cent. of the child population have been inoculated, from 11 per cent. in the non-inoculated to 2 per cent. in the inoculated, and the fatality rate has fallen from 7 to 0.2 per cent. In Lodz, where 90 per cent. of the children have been inoculated, the morbidity has fallen from 5 per cent. in the non-inoculated to 1 in the inoculated.

A CIVILIAN BASE HOSPITAL

The "change-over" which was effected in the hospitals of this country during the days when it became clear that war was imminent will make an exciting chapter of history when those concerned can find sufficient detachment to write it. Almost in a day the ordinary patients were evacuated, thousands of beds made ready for civilian casualties, and staffs found themselves in wholly unfamiliar surroundings. It is hardly necessary to repeat that the London hospital region is divided into ten sectors, each of which has at its apex one or more of the teaching hospitals. In each sector there are a number of affiliated hospitals, some of which are intended for the reception of major casualties, and others for minor cases, and again in each sector there is one large institution, or perhaps more than one, which is described as the base or advanced base hospital. It is in these base hospitals, situated somewhere in the home counties, perhaps twenty or forty miles from London, that the most astonishing transformations have taken place. If the base hospital was already a general hospital it has been only a question of expansion to make it adequate to the new demands, although this has entailed no little stress, and to those who have been working in such a hospital the drastic interruption and sometimes the abandonment of plans for the future has meant a sacrifice which has been readily accepted. But in some cases it is a public assistance institution, a special school, a sanatorium, or a mental hospital which has been taken over, and here a large degree of adaptation has been necessary.

Change Over at Horton

The largest of the base hospitals in the London region is Horton at Epsom, one of the mental hospitals of the London County Council, ordinarily accommodating over two thousand mental patients. The change over to a war basis that took place there on August 28 may give some idea of the problems met with at base hospitals. Almost the whole of the mental patients, to the number of 2,200, were transferred to a number of other institutions, such as Banstead and Cane Hill, which by a certain amount of rearrangement managed to accommodate them in addition to their own. The malarial unit is being maintained at Horton in a special building, so that a strain of malaria is available for the treatment of neurosyphilis, and a certain amount of research is still proceeding, but otherwise Horton, which was a military hospital during the last war, has ceased for the time being to be a mental institution and has made itself ready to receive large numbers of civilian casualties. As the advanced base hospital for sectors 8 and 9, which have St. Thomas's Hospital and King's College Hospital respectively at the apex, it has provided 2,560 beds. The male and female wards alternate in the two-storied bays which form a large semicircle in the Horton building. The big day room has been converted into three operating theatres, each with two tables, with ample accommodation for sterilizing plant, preparation rooms, and so forth, and there are smaller operating theatres elsewhere. Adjoining the theatres are resuscitation rooms, each with about twenty beds. It is considered that resuscitation may be a necessary part of the organization which is concerned with the reception and distribution of the patients, and a team has accordingly been trained with this requirement in view. The former entertainment hall is a Red Cross dispensary; splint rooms and many other appropriate departments have been provided, and a certain amount of x-ray and other equipment has been installed from the central hospitals.

Organization of Work and Personnel

For the purpose of treating civilian casualties the hospital has been divided into five units, each of which, to facilitate direction, has been given a different colour scheme. Four of these units are entirely concerned with the care of the sick and wounded; each of them is under the leadership of a surgeon on the staff of King's College Hospital, and the staff attached to each unit consists of three surgeons, one physician, two anaesthetists, and a number of medical officers. The fifth unit has to do with the reception and distribution of cases, and is under the charge of a physician of King's College Hospital, who has organized the methods by which admissions are to be regulated. Each of the four treatment units will have one "take-in" day out of every four. On that day it will receive the bulk of the admissions, although the other units will also be admitting, particularly to the wards earmarked for specialist treatment. The "take-in" day of each unit is from 12 noon to 12 noon on the following day, and the physician attached to the unit is on duty for the twenty-four hours during which the unit is "taking in."

The surgeon who is the leader of the unit organizes the whole of its work, and himself carries out such operative work as he deems necessary. He reports to the medical superintendent, to the physician in charge of the medical division, and to the surgeon in charge of the surgical. The other surgeons of the units receive instructions from their respective heads and undertake such surgical work and charge of wards as is allotted to them. They perform twenty-four hours' orderly duty—the daily order is posted in the medical officers' library—during which time they must be within the hospital precincts and readily found. The surgeons are also expected to give to the theatre sisters lists of operations so far as possible by a certain hour of the evening and morning so that the daily programme of the theatres may be arranged in good time. The anaesthetists, although they are attached to particular units, may frequently be required to anaesthetize for surgeons of units other than their own. Medical cases are distributed among the wards, and a physician is attached to each unit to advise in a consultative capacity both on these cases and on the medical aspect of surgical cases. There are also attached a number of medical officers. In each team one or two of these are part-time officers, who are local practitioners in Epsom and come in for a session of two and a half hours daily. The others are all whole-time, and have general charge in the unit to which they are attached of both wounded and sick, and act in a surgical or medical capacity, performing operations and administering anaesthetics when required. Arrangements for midwifery when these are necessary are made with the Surrey county hospitals. Pathological work is carried on in the laboratory at Horton not only for its own staff but for the staffs of some of the associated hospitals.

The nurses now attached to Horton number rather over 700. About 200 have been drafted from King's College Hospital, 40 from St. Thomas's, and 400 from the London County Council general hospitals. There are also about 70 female nurses and 45 male remaining from the ordinary Horton staff, all of whom, of course, have experience in mental nursing. About thirty members of the Civil Nursing Reserve, many of them in training, are at the hospital.

Instruction for Medical Students

Medical students, the majority of them from King's College Hospital and a few from St. Thomas's, have been received, and a considerable amount of instruction is provided. (It should be explained that although Horton is the base hospital for both the King's College Hospital and the St. Thomas's Hospital sectors, the latter has also a base at Park Prewett Mental Hospital, Basingstoke, and an advanced base at Brookwood.) More than fifty students are living in villas on the Horton estate. Lectures by members of the King's teaching staff and some members of St. Thomas's and one or two others are being given every other day. The subjects have to do with the kind of cases which may be expected in the wards. The programme for September and October includes lectures on head and chest injuries, abdominal wounds, fractures, burns, wound infections, gas casualties, and war neuroses. A perambulating museum has been arranged, including groups of pathological specimens, which goes in turn to the three hospitals in sector 9 in which the students are distributed—namely, Horton, Redhill County Hospital

(where 635 beds are allocated for civilian casualties), and the Royal Blind School, Leatherhead (900 beds). A few beds at Horton are at present occupied with ordinary cases transferred from King's College.

The change which has taken place at Horton with such celerity and efficiency has been, of course, repeated in many other places, but the size of this institution in Surrey makes it specially noteworthy. Behind the rearrangement of staff and bed accommodation lies a vast amount of detailed work concerning water supply, sanitary arrangements, heating and lighting, the installation of lifts, and other measures necessary for the reception of possibly very large numbers of injured persons.

Meanwhile—and mercifully—the casualties for whom these elaborate arrangements have been made do not arrive. There can be no shadow of doubt that this vast disorganization of the peace-time medical services was necessary at the very beginning of war. And no one can yet tell what calls will be made upon those who are now standing by—for the most part in a state of suspended activity. This in itself creates an immediate problem that may prolong itself for who knows how long. Care should be taken to ensure that mobilization of the profession should not be converted into a partial immobilization.

Correspondence

Treatment of Psychological Casualties During War

SIR,—Having had four years' experience of war neuroses, the last two in command of the Seale Hayne Hospital for functional nervous disorders, I was much interested in Dr. Maurice Wright's article on the treatment of psychological casualties during war (*Journal*, September 16, p. 615). But he gives a very unfair picture of what he calls the authoritarian method, as the harsh system adopted by Lhermitte was, so far as I know, never used in England. We gradually discarded both faradism and hypnotism as our experience increased, and their employment was never recommended to the medical officers sent to us for courses of instruction. Our psychotherapy consisted of simple explanation, persuasion, and re-education, and it almost invariably resulted in the complete disappearance at a single sitting of the hysterical symptoms, even when they had been present for a year or more. Only one of the ten medical officers who worked with me at Seale Hayne Hospital had had any previous training in psychology, and he proved no more successful than any of the others as a war-time psychotherapist. Many of the patients were sent to home duty, but the majority, having been already in hospital for many months when they reached us, had to be discharged from the Army, but they proved quite fit to return to their civilian occupations.

We did not find, as Dr. Maurice Wright appears to have done with his more psychological methods, that the patients "regressed to a level of infantile dependence and made mother figures of their nurses," from which they had to be "slowly weaned." They had no time for this, as they were generally restored to full activity the day after admission and were kept employed on the farm or workshops. Their attitude to the very small nursing staff was exactly the same as that of any other soldiers.

Dr. Maurice Wright repeats the common criticism of "the authoritarian method" made by psychiatrists who have had no experience of it—that it does not make for permanent cure. But in our experience relapse was very uncommon and new hysterical symptoms never developed. This has also been my experience with the many civilian patients with gross hysterical symptoms who have been treated by similar methods by my colleagues and assistants at New Lodge Clinic and at Guy's Hospital since 1919.—I am, etc.,

Sept. 18. ARTHUR F. HURST.

Disintegrating Emotions In War

SIR,—On behalf of a number of medical practitioners throughout the country, please let me thank you for your leading article in the *Journal* of September 9. The task of "preventing the disintegrating emotions of hate, fear, panic, and vengeance" is one that the profession as a whole must undertake.

At the beginning of the last war we had no hatred for the German people. But, as the atrocity stories multiplied and the casualty lists lengthened, the emotions aroused were expressed as hatred for the whole German nation. We are now at the beginning of a struggle which in length and frightfulness may exceed the last. If as a nation we do not conquer those "disintegrating emotions" a peace more bitter and vindictive will inevitably follow. Lord Halifax recently said, "Fresh insistence in thought and action on those principles of morality and faith, which are fundamental, will not only build national well-being but is the only source from which we may draw sure hope for peace and prosperity for a disturbed world." By these means, if we as a profession follow your lead, we can begin now to lay the foundations of a just and lasting peace in the place where, in truth, they must be laid, in the mind and will of the individual.—I am, etc.,

DAVID WATSON, M.B., CH.B., D.P.M.

London Hospitals in War Time

SIR,—Your leading article on London hospitals in war time (*Journal*, September 16, p. 610) makes reference to all but a few of the teaching hospitals. Since omission might suggest a failure of service to the ordinary civilian sick, may I say that at St. George's Hospital we have not throughout ceased to admit any but very chronic cases. Our out-patient clinics, both general and special, have also continued to function as before with the exception of the children's and the ante-natal clinics. The latter will reopen as soon as the need arises.—I am, etc.,

London, S.W.1, Sept. 16. C. BLAXLAND LEVICK.

SIR,—With reference to your leading article on London hospitals in war time (*Journal*, September 16, p. 610), may I point out that the activities of the Western Ophthalmic Hospital have not been suspended even for a day. Work has proceeded uninterruptedly in all departments—out-patients, in-patients, including operations, laboratories, etc.—and it is the intention of the Committee of Management and the staff that it shall continue to do so.—I am, etc.,

A. RUGG-GUNN, M.B., F.R.C.S.,
Senior Surgeon, Western Ophthalmic Hospital,
Marylebone Road, N.W.1.

*** The leading article referred to was intended to give a general impression of the present state of affairs, particulars being given to illustrate some of the points discussed. The absence of reference to any one hospital was not meant to imply that such a hospital was not offering services to the civilian sick.—ED., *B.M.J.*

Malaria Therapy Centre in War Time

SIR,—Of recent years many cases of neurosyphilis have been treated by malaria therapy in the London general hospitals. Those facilities for treatment no longer exist. I am writing to say that the Ministry of Health, in conjunction with the London County Council, have made arrangements for the Malaria Therapy Centre at Horton Hospital, Epsom, to continue. Accommodation can be provided for private patients (at an inclusive cost of 4 guineas a week), voluntary and certified patients. All rate-aided patients should have a London settlement.

Inquiries regarding possible admission should be addressed in the first instance to the Medical Officer in Charge, Malaria Therapy Centre, Horton Hospital, Epsom, from whom the necessary application forms for admission can be obtained. Telephone number, Epsom 9872.—I am, etc.,

W. D. NICOL,
Epsom, Sept. 18. Medical Superintendent, Horton Hospital.

X-ray Examination of Militiamen

SIR,—In May last you were good enough to publish a letter from me urging the necessity for the routine examination of militiamen to include an *x*-ray examination of the chest. I have seen no further reference to this important subject except for a question by an M.P. in the House, and a recent incident related in the Press shows plainly the necessity for such an examination.

Have we to wait until the next war until something is done about this, or are we to spend our next peace paying pensions to men or their dependants who should never have been admitted into the Services?—I am, etc.,

London, W.1, Sept. 13. J. V. SPARKS.

Accommodation for the Tuberculous

SIR,—In a letter which was published in the *Times* of September 12 Dr. C. Willett Cunnington called attention to the misdirected zeal displayed in the emptying of our hospitals, "as though"—to quote his words—"real and immediate needs were less important than those problematical and remote." A similar protest should surely be made against the emptying of sanatoria and hospitals for tuberculosis. I do not know to what extent this has actually been carried out, but I do know of one area at least where it has been done, and as this was in obedience to orders from the higher authorities I presume that the same instructions have been issued to local authorities elsewhere. In the case of such special institutions as sanatoria and hospitals for tuberculosis this means that patients have to be returned to their homes. Pulmonary tuberculosis is an infectious disease, and the result may be that many fresh cases of infection may occur during the three or four years' expected duration of the war, and the diminution of the disease on which we have prided ourselves may give place to a most regrettable recrudescence in the years to come. Besides this, there is the interference with the treatment of this multitude of patients, with all its deplorable consequences, early cases that might quite well have become arrested progressing instead to advanced disease, while others in whom the disease might have been arrested by the timely induction of artificial pneumothorax must now be deprived of this—one of the most hopeful measures in the treatment of the disease.

Surely in all this there is a lack of that sense of proportion of which we have seen so much evidence in these days of war-scare.—I am, etc.,

E. WEATHERHEAD,
Late Tuberculosis Officer, N.E. Division, Cheshire.

Southborough, Tunbridge Wells, Sept. 13.

Varicosities of Veins

SIR,—In reference to the article in the *Journal* of August 19 (p. 383) on varicosities of veins by Professor Lambert Rogers, and the correspondence in your issue of September 9 (p. 581), may I point out that the question of the preliminary ligation of the internal saphenous vein in its upper part was briefly but thoroughly reviewed in the *Journal* of July 13, 1935 (p. 49). The great risk which apparently exists of ligaturing the saphenous vein close to the sapheno-femoral junction was pointed out and compared with the risk of its ligation lower down, which is a small one. A possible explanation of the difference in risks was offered. No essential new facts have come to light since that date as far as I am aware, though opinions on the subject have sometimes been given the status of fact.—I am, etc.,

London, S.W.1, Sept. 16. G. H. COLT.

The War and the Royal Medical Benevolent Fund

SIR,—In spite of the unprecedented difficulties which members of the medical profession are experiencing owing to the war, may I appeal through you, Sir, to all our regular subscribers who have not yet sent in their contributions to the Fund for the current year to do so now or as soon as possible.

If we are to do our part, as the profession will expect us to do, in continuing to help our aged beneficiaries and also those who may suffer privation owing to the war, it is vital that we should receive financial support not only from our regular subscribers but from every member of the profession. Cheques should be made payable to the Royal Medical Benevolent Fund and sent to Wormingford Grove, Wormingford, Essex.—I am, etc.,

LEWIS G. GLOVER.
London, W.1, Sept. 18. Honorary Treasurer.

Treatment with Standard Dielectric Oil

SIR,—At this time, when burns are likely among air-raid casualties, and burns and scalds may be more frequent owing to diminished illumination, may I draw attention to the treatment of burns by standard dielectric oil. The oil is a refined form of paraffin, and has more penetration than ordinary medicinal paraffin. I have had many years' experience of its use, and its advantages over any other kind of preparation are that it can be rapidly applied over a large surface, and it prevents shock and sepsis. Fluid from blisters should be removed, and the oil applied on lint; this should not be removed, but fresh oil added to the surface of the lint for two or three days. In the last war we used bipp, which at once relieved pain, and the dressings could be kept on for a week; this was due, I believe, mainly to the paraffin content.

I used this dielectric oil in the case of an 18-months-old child who had been scalded by boiling water up to the waist; crying ceased in five minutes, and there was no shock and no temperature. After all-night treatment in a case of acute bronchitis, the oil being applied over the affected area, the temperature dropped from 104° F. to normal, and abnormal sounds were heard with difficulty; recovery was rapid. In the case of a nervous child with a wound over the knee-cap which was full of sand, dust, and horsedung, pain was immediately relieved and hysterical symptoms quietened. Dirt was removed without pain as it came to the surface; there was no suppuration. After a few days salt solution was substituted. The end-result was excellent.—I am, etc.,

Highgate, Sept. 14. W. GUYON RICHARDS.

Electrotherapeutics in Military Hospitals

SIR,—I wish to support Dr. Wilfrid Garton on the subject of electrotherapeutics in military hospitals in the *Journal* of September 16 (p. 622). From 1916 to 1920 I had charge of the electrotherapy and massage department at Summerdown Camp, Eastbourne. This grew to be probably the largest establishment of its kind in the kingdom, and was staffed by forty masseuses, most of them original members of the Almeric Paget Massage Corps.

The immense quantity of work these splendid women got through was made possible by a particular lay-out of instruments and by including all kinds of treatment in each ward. Each masseuse was allotted a treatment table, bed, use of a wall switch, and various accessories. By a judiciously arranged time-table she was able to supervise efficiently as many as five cases at the same time—for example, one man might be in a radiant heat bath, a second having ionization, a third interrupted and reversed Faradism, a fourth stimulating his own muscles by a low-tension portable coil, and a fifth receiving massage by the masseuse herself. This system, besides being economical in time and cost, also makes for the happiness of patients, who find interest in the company of their fellows and avoid the monotony of a solitary treatment hour.

Each masseuse was able to get through as many as twenty cases in her working time, and it was no uncommon thing for the whole staff to give some 800 or more treatments in one day. Our busiest year was 1918, when 6,636 patients passed through this department. The list in May of that year rose to 1,726, and for twelve weeks afterwards the number of daily treatments averaged over 850. The work of the masseuses was supplemented by the establishment of a corridor fitted for

remedial exercises, and I can advocate this as a most valuable accessory to an electrotherapy department.

We were most interested in the many cases of injured main nerves sent in either for diagnosis or for treatment after operation. A casual census one day showed no less than 175 such cases under care at the same time. The method of diagnosis evolved and the results of treatment are given in a paper by myself and Capt. A. L. Home, which is now decently buried in the *Journal of the R.A.M.C.* (December, 1919). Altogether one finished this experience with a profound belief in the efficacy of the treatment in suitable cases, and not the least part of the value of an establishment such as we had at Summerdown was its contribution towards the happiness of the camp as a whole. The patients felt that something concrete was being done for them and co-operated in their treatment with interest and enthusiasm.—I am, etc.,

Cheltenham, Sept. 17. J. S. KELLETT SMITH.

Treatment of Nocturnal Incontinence

SIR,—I was interested in the report by Professor A. Rendle Short (*Journal*, September 9, p. 580) on his four cases of nocturnal incontinence, chiefly because it supports the theory that enuresis is associated with a pathological state—however trivial it may be—which is situated in the posterior urethra. I incline to this view as a result of observations I have made on several hundreds of enuresis cases during the past twelve years at the Children's Hospital with which I am associated. Like Professor Rendle Short, I also have had gratifying results by treating the posterior urethra in the male, and I hasten to add that equal success was obtained by the same means in the female.

My colleague from Bristol makes the suggestion that an examination of the posterior urethra might reveal a pathological condition here; such an investigation actually does show this state of affairs. If one of these children is cystoscoped in the lithotomy position usually a completely healthy state of the bladder is to be noted until the internal urinary meatus is closely inspected, where, as a rule, mild oedema is found to exist; a little experience is required to recognize this. It is one of the fortunate circumstances in cystoscoping children of either sex in the lithotomy position that a good view is always obtainable of the whole floor of the posterior urethra; and in these particular cases a close scrutiny of this part invariably reveals a mild inflammatory change, and this generally in spite of a report that the urine is free from pathological elements.

My method of treating these patients has been, principally, to gently dilate the whole urethra. There have been many cases in which associated conditions which probably predispose to the changes in the deep urethra have also been present; this is believed to be the case because of the satisfactory response of the principal symptom when such conditions were treated. The two chief of these are: in the male, narrowing of the external urinary meatus with its associated inflammation of the adjacent urethral mucosa, adherent foreskin with retained smegma, meatitis following circumcision; in both sexes, a generalized narrowing of the whole urethra. The latter state can only be determined by a knowledge of the normal urethral calibre according to age. In some children small amounts of residual urine are present in the bladder; no doubt these are a further consequence of the urethral state.

Professor Rendle Short has referred specially to the enuresis cases with diurnal frequency. My investigations have made it clear that this symptom is merely an indication that the inflammatory process has gone a step further and involved the internal meatus a little more severely. Moreover, experience shows that such cases respond more readily to the treatment I have indicated than those where this symptom is absent. As the patients in this group tend ultimately to have attacks of so-called pyelitis this tendency is also controlled by the urethral treatment. Generally speaking, the treatment I have followed in both male and female is simply gently to dilate the urethra under an anaesthetic. In many cases the result of doing this on one occasion only is an apparent cure of the incontinence. On the other hand, some cases require two or three dilatations at intervals of two or three months before any definite improvement occurs. It is true to say that some of the cases are not cured, but as a result of treating some hundreds of cases by this method the number which are not improved is quite negligible.

It certainly is interesting to speculate as to why there should be any response at all to this line of treatment. I believe the explanation is that the dilatation promotes drainage of the products of inflammation from the urethral wall generally by dilating the orifices of urethral glands and rupturing minute intra-epithelial inflammatory cysts. It is my intention at some time in the near future to publish the details of the large series of cases that have passed through my hands. In the meantime I would warn those who would be tempted to try this treatment that if metal instruments are used only those which are specially constructed for children should be employed; and that in any case urethral instrumentation in male children is a delicate operation, and it is wise to leave this branch of surgery to those who have opportunities for special experience of it. I would like to make this an occasion for saying that the data which have been forthcoming from observations on enuresis cases have made this branch of work for me one of the most interesting parts of urological practice. This is not only because of the striking results that are to be obtained from treatment, but because of the enlightenment I have received on the beginning of many cases of chronic disturbances of micturition which I have met with in adult life.—I am, etc.,

H. P. WINSBURY-WHITE,
Urologist, Princess Elizabeth of York Hospital for Children.

London, W.1, September 14.

SIR,—I read with interest Professor Rendle Short's letter (*Journal*, September 9, p. 580) on the treatment of bed-wetting by the injection of silver nitrate into the deep urethra. But I should like to point out that no evidence is adduced to favour the view that this treatment is more rational than any other. All that can be claimed is that it was successful in three out of four cases. Against this we must place (1) the notorious fact that bed-wetting is more readily relieved by a treatment which is dramatic irrespective of its nature, and here we have a very dramatic treatment; and (2) the fact that two of the cases were adolescent, an age when the spontaneous cure of the condition may be expected.

May I in conclusion suggest that it is the deep psyche rather than the deep urethra which is of fundamental importance in the cause and cure of bed-wetting.—I am, etc.,

London, W.1, September 14. W. PATERSON BROWN.

Spinal Anaesthesia

SIR,—I read Dr. C. E. Gautier-Smith's letter in your issue of September 9 (p. 579) with interest because I too have found "heavy" percaine a very efficient agent for producing spinal anaesthesia. I think, however, that Dr. Gautier-Smith's advocacy of its use in all degrees of spinal anaesthesia should not be allowed to pass unchallenged. The great disparity between the specific gravity of "heavy" percaine and that of the cerebrospinal fluid makes it an ideal agent for the production of anaesthesia in the lower limbs, the perineum, the pelvis, and perhaps in the abdomen below the umbilicus, particularly where a long period of anaesthesia is desired. For any operation above the umbilicus or in the lower abdomen when the steep Trendelenburg position is to be employed the high specific gravity of "heavy" percaine renders it not only unsuitable but unsafe. It is essential in all upper segment spinal anaesthesia to place the patient early in the Trendelenburg position and to maintain it throughout and after the operation. This can only be done with safety to the patient if a hypotonic or isotonic solution has been used as an anaesthetic agent.

The fixation times of the agents used to produce spinal anaesthesia vary not only among themselves but in different patients with the same agent. It is therefore unsafe to adopt the Trendelenburg position after using a hypertonic agent

after an arbitrary interval so short as fifteen minutes. It is my practice to select the agent and the technique which seem most suited to each individual patient. In all upper segment spinal anaesthesia I use either "spinocain" or "light" percaine. In my experience there is a much more profound fall in blood pressure following the administration of percaine than spinocain; for that reason I reserve the use of "light" percaine for those cases in which my preliminary examination has revealed a sound cardiovascular system and in which a prolonged anaesthesia is required, and for those which I judge to be unable to submit to the changes in posture necessary for the use of spinocain. In all others I prefer to use spinocain, and if this should fail to give the length of anaesthesia required, to supplement it with either general or intravenous anaesthesia; in practice this supplementary anaesthesia is rarely necessary.

Had I witnessed the "technique" which Dr. Gautier-Smith so rightly ridicules I should have described it as pathetic! I do not know, nor do I believe there exists, any "technique" such as he describes. The technique of any spinal anaesthetic demands that the patient shall at all times be moved as little as possible and with the greatest care. The techniques for the use of hypotonic spinal anaesthetic agents have been carefully evolved by anaesthetists who number their cases in thousands. Faithfully carried out these techniques are eminently efficient and safe, and there is in my experience very little if any disturbance of the pre-anaesthetic sedation, even when it is necessary, as it sometimes is, to sit the patient up in order to perform a difficult spinal puncture.—I am, etc.,

Broadstone, Dorset, Sept. 15. S. F. DURRANS.

SIR,—I should like to endorse Dr. Gautier-Smith's plea in the *Journal* of September 9 (p. 579) for the fuller trial of heavy percaine (1 in 200 with 6 per cent. glucose) as a satisfactory spinal anaesthetic. This preparation has been extensively used in the anaesthetic department at Oxford with safety and success. I would like to point out, however, that Dr. Gautier-Smith's criticism of a technique in which a "semi-conscious patient" is supported sitting up by "a staggering nurse while the anaesthetist holds a stop watch, waiting to give the signal for him to be thrown on to his abdomen, only a second or two later to be turned over on his back," is hardly fair either to the Etherington-Wilson or to the Howard-Jones method, both of which it seems to involve and confuse. Assuming that the Etherington-Wilson technique is alluded to by the above description, one should remember that most of the dangers and unsatisfactory results from its use have occurred at the hands of those who have tried to improve upon, or have otherwise not followed accurately, the simple instructions of its originator.

Dr. Gautier-Smith also claims that when using heavy percaine one can tilt the patient into a full Trendelenburg position after fifteen minutes with perfect safety. Although this can frequently be done with no apparent ill effects, the wording "with perfect safety" may be misleading to anyone unfamiliar with the technique. It is possible by injecting a small dose of this solution and then tilting the patient into a moderately steep Trendelenburg position to obtain anaesthesia to a much higher level than would be obtained by using the same dose and not tilting the patient so steeply. In the former case the small dose is caused to run over a comparatively large area of nerve roots and appears to be absorbed and fixed quickly. If, on the other hand, a less steep tilt were employed a larger dose of percaine would be required to anaesthetize up to the same level. This larger amount would take longer to become fixed. An early "full" Trendelenburg position in this latter example would tend to cause the still unabsorbed percaine to track upwards towards the vital centres. In this case, therefore, it would seem prudent to allow half an hour to elapse before tilting the patient into "full" Trendelenburg position in accordance with the findings of Rink and Harris (*Guy's Hospital Reports*, January, 1937) on the fixation and absorption rate of percaine by the cerebro-spinal fluid and spinal roots.—I am, etc.,

Department of Anaesthetics,
The Radcliffe Infirmary, Oxford,
September 15. F. K. BOSTON.

Obituary

MRS. R. G. BURDEN

We regret to announce the death on September 17 at Clevedon Hall, Somerset, of Mrs. R. G. Burden, widow of the late Rev. H. N. Burden, who established the Stoke Park Colony for Mental Defectives near Bristol. More than thirty years ago Mr. Burden was a leading member of the Royal Commission on the Care and Control of the Feeble-minded, and his interest in this subject led to the development of the National Institution at Stoke Park for Persons requiring Care and Control. Mrs. Burden carried on the work at Stoke Park Colony, and in 1933 proved herself to be one of medicine's generous benefactors by offering an endowment for mental research. This offer was announced by Professor R. J. A. Berry at the Council Meeting of the British Medical Association on January 25, 1933, in the following terms:

"With the knowledge of the Trustees, Mrs. R. G. Burden of Clevedon Hall, Clevedon, Somerset, Warden of the National Institutions for Persons requiring Care and Control, has intimated her desire of making available for the encouragement and prosecution of research into mental problems and disorders a sum not exceeding £10,000. It is not her intention to make a single payment, but to guarantee the expenses of such research over a fixed period of years, say five, to the amount specified. It is her further desire that the general control and supervision of such research shall be undertaken by Professor R. J. A. Berry, Director of Medical Services, Stoke Park Colony, Stapleton, Bristol, and recently chairman of the Mental Deficiency Committee of the British Medical Association. Should a committee be eventually established to assist in the management of the research it is also the donor's desire that Professor Berry should act as chairman of such committee, and that, whilst the committee may hold its meetings where most convenient to itself, the headquarters of the research should be the laboratories of Stoke Park."

In view of the scope and possibilities of this endowment, a committee of administration was set up on which the Chairman of Council of the British Medical Association or other member of Council to be nominated by him served, with Dr. G. C. Anderson acting as its official secretary. The work that has issued from Stoke Park Colony during the past six years from its highly capable medical staff has fully proved the wisdom of Mrs. Burden's munificent act and is a tribute to the wise administration of the research fund. In addition to this, Mrs. Burden then proceeded to build and equip the Burden Neurological Research Institute, which was opened on May 12 this year by Sir Thomas Inskip (as he then was), Sir Lawrence Brock, Chairman of the Board of Control, presiding. Professor F. L. Golla was appointed Director of the Institute, in which the intention is to investigate a small number of carefully selected cases, especially on electro-physiological and endocrinological lines.

Professor R. J. A. Berry, Director of Medical Services at Stoke Park Colony, writes:

Mrs. R. G. Burden's recent death—not unexpected to those who knew the pathetic facts—has left a void in the annals of mental scientific research which will not be remedied or adequately filled for many years to come, if ever.

Some thirty years ago, long before the present world had dreamed of warfare as a scientific means for the extermination of civilized people, Miss R. G. Williams was invited to assist for the brief period of a few weeks the late Rev. H. N. and Mrs. Katherine Mary Burden in the organization of their then new and recent creation of Stoke Park Colony for the care and alleviation of that form of mental illness now known as mental deficiency. So adequately and with such devotion did the then Miss Williams fulfil her voluntary duties that the few weeks extended into months and the months into years.

Eleven years ago I first met the Miss Williams of long ago as Mrs. Harold Nelson Burden, whose obituary tribute this now unhappily is. In those years I have come to know Mrs. Burden as a woman wholeheartedly devoted to her work, to the greatness of the objectives she had at heart, and to the memory of a husband whom it was my great privilege to know and to serve. I have the further reason to know and appreciate more than many others what Mrs. Burden, inspired by her devotion to duty, has done for mental science in general and the mentally afflicted in particular.

Professor MARCEL LABBÉ whose death has occurred recently, began his medical studies at Nantes. They were continued in Paris, where he became a hospital intern in 1894. In association with Professor Bezançon he did important work on the lymphatic glands and on the part they play in infections. His studies of the blood, from the physical and chemical points of view, were extensive and informative. During his latter years he concentrated on the study of the disorders of nutrition, and he was regarded as an authority on diabetes.

The following well-known foreign medical men have recently died: Dr. PAUL CAMUS, physician to the Bicètre Hospital, Paris, brother of the late Drs. Lucien and Jean Camus, members of the Académie de Medécine; Dr. ALFRED O. LEE, professor of modern languages and of the history of medicine at Michigan University, aged 65.

Medical Notes in Parliament

Hospital and Casualty Services

In a statement to the House of Commons on September 13 Mr. CHAMBERLAIN said that as he had stated in the previous week some 200,000 hospital beds were made available by various means for the reception of civilian air raid casualties. These beds were also available for Service sick and casualties. It was also part of the Government scheme that these hospitals should continue to admit ordinary acute surgical or medical cases among the general population. This "reflux" was taking place and would continue. There were therefore facilities available to ensure that any patient whose medical condition required in-patient treatment should be able to obtain it. These cases would encroach upon the number of beds immediately available for the reception of casualties, but this was being met by increasing the numbers of extra beds, by pressing forward with the building of hutted wards, and by providing further temporary accommodation in large tents. The net result was that in spite of fresh admissions the number of beds immediately available on September 12 had been maintained at the figure of 200,000. The Government had asked that out-patient facilities for the ordinary civilian sick should be maintained, and this was being done.

First-aid posts, both fixed and mobile, had been in general duly established and equipped. The emergency ambulances had been assembled and fitted up. Motor coaches in the provinces as well as in London had been converted for use as inter-hospital ambulances. The full complement of casualty evacuation trains for civilian cases had been assembled and staffed and provided with medical equipment. Some shortage of extra beds, bedding, dressings, and surgical equipment had been reported from a number of places, but was being met as rapidly as possible by accelerating the delivery of goods on order, by the diversion of supplies from places more favourably situated, and by placing fresh orders. In particular surgical instruments were now being delivered in considerable numbers and others had been obtained on loan from hospitals and surgeons having a surplus available.

Universities' Statutory Obligations in War Time

Sir ERNEST GRAHAM-LITTLE asked on September 13 whether, in view of the membership of Convocation of the University of London exceeding 17,000 graduates, the Government would give relief by legislation to the authorities of Convocation from their statutory obligation of convening Convocation for the conduct of elections to the senate and other offices or for ordinary meetings during the present crisis. Mr. KENNETH LINDSAY replied that it was open to the University of London, perhaps in common with other Universities, to promote a Bill making possible the suspension of normal statutory obligations.

Remuneration of Emergency Medical Services

Mr. J. PARKER asked Dr. Elliot on September 13 a question, asserting that there was great discontent in the emergency medical service arising out of the fact that many nurses, medical students, doctors, and others were expected to give their services voluntarily or for purely nominal remuneration. He asked the Minister to examine and rectify these grievances. Dr. ELLIOT replied that he was unaware of any such discontent. This country had a great tradition of voluntary service to those in need, and those who gave such service, whether in peace or war, were rightly proud of it. Standard rates of payment had been arranged for doctors, nurses, and nursing auxiliaries employed whole time in the service. With regard to medical students, he understood that in general they were most willing to assist in the treatment of casualties. He could not believe that they wished to profit by the circumstances of war.

Conditions in Reception Areas

On September 14 Mr. EDE opened a debate on evacuation. During the discussion cases were adduced of poor conditions in the reception areas, particularly at Inveraray, and complaints were cited of the billeting of verminous children, the transport to reception areas of children suffering from disease, and of the fouling of houses by billeted persons. Mr. COLVILLE said a large number of persons had been evacuated smoothly, but at Inveraray a mistake was made about the accommodation available. Speaking for Scotland he undertook that no child would be transferred to a billet in a verminous condition. If it became necessary to move a child who was not free from infection or disease he would endeavour to arrange for its reception into an institution or other place where it could be properly attended.

Dr. HADEN GUEST said the reports of school medical officers of such towns as Glasgow, London, and Edinburgh always showed a proportion of verminous children. There was not more than the usual proportion among the children who had gone to the country areas. His inquiries in Essex, Herts, Bucks, Oxon, Worcester, and Kent showed him that so far as the school children were concerned the evacuation had been an outstanding success. He had heard reports of rooms fouled by use as latrines. That never happened in people's own homes. It seemed due to a psychological disturbance caused by the transfer to the country. They ought to aim at securing for the evacuated children the optimum diet laid down by the medical authorities consulted by the Government. Mr. CLEMENT DAVIES said there should be a medical inspection before the children were evacuated.

Dr. ELLIOT stated that so far as the children were concerned the scheme had been a considerable success. He repeated for England and Wales Mr. Colville's assurance that unless under "rush" conditions no child would be sent to a billet unless it had been inspected and found to be in a billetable condition. Compensation would be paid to householders for infestation of bedding. Arrangements had been made, in co-operation with the British Medical Association, for providing children with medical attendance, and any householder on whom an unaccompanied child was billeted might, if he thought it necessary, call in a doctor without expense to himself.

Dr. ELLIOT later stated that the general standard observed in billeting evacuated persons was one person per habitable room. This density might have been exceeded as a temporary measure, but redistribution from overcrowded districts was taking place. Children of various ages were reckoned according to the overcrowding regulations.

Medical News

Readers may find the following references to back numbers of this year's *British Medical Journal* useful at the present time:

Organization of Medical Services in War: Address by the Minister of Health on February 15. (February 18, p. 335.)

Hospitals in Time of War: Emergency Arrangements. (March 4, p. 465.)

Emergency Hospital Organization in London: Grouping for Casualties. (March 25, p. 634, and April 1, p. 689.)

Antitoxins for War Emergency: Medical Research Council's Plans. (April 8, p. 738.)

First-Aid Posts in London: Progress in Organization and Recruitment. (May 6, p. 942, and May 20, p. 1070.)

Blood Transfusion Service for War. (July 1, p. 35.)

Blood Transfusion Centres. (July 15, p. 130.)

London Hospitals in War Time. (July 22, p. 188.)

Emergency Hospital Organization. (*Supplement*, July 22, p. 49.)

Doctors in Time of War: Scale of Pay for Emergency Medical Service. (July 29, p. 238.)

Emergency Hospital and Radium Store at Northwood. (August 12, p. 366.)

Central Emergency Committee Notices. (*Supplement*, September 2, p. 165.)

Emergency Medical Services: Treatment at First-aid Posts. (*Supplement*, September 2, p. 166.)

Provision of Sera for Tetanus and Gas Gangrene. (*Supplement*, September 2, p. 169.)

Officers of (*a*) Central Emergency Committee, (*b*) Central Emergency Committee for Scotland, and (*c*) Central Emergency Committee for Northern Ireland; Secretaries of Local Emergency Committees in (i) England and Wales, (ii) Scotland, and (iii) Northern Ireland; Group Officers for Civilian Hospital Medical Service; Special Medical Certificates for (*a*) War Injuries, (*b*) Incapacity for Work, and (*c*) Deaths in Time of War. (*Supplement*, September 9, p. 173 *et seq.*)

The outbreak of war has increased the number of letters addressed to the Editor asking for addresses to be changed for the receipt of the *British Medical Journal*. In order to save time such requests should be sent to the Accountant of the British Medical Association (B.M.A. House, Tavistock Square, London, W.C.1), and not to the Editor.

Owing to the war the annual conference of surgeons of the St. John Ambulance Brigade, which was to have been held in London on October 14 and 15, has been cancelled.

The Harveian Oration of the Royal College of Physicians and the Harveian dinner, which were to have taken place on October 18, have been cancelled.

In the present national emergency it may be impossible for the Medical Society of Individual Psychology to hold meetings. As opportunities for meetings occur, however, notices will be sent and the programme for 1939–40 will be followed as far as possible.

All meetings of committees and subcommittees of the British Medical Association, with the exception of the Central Emergency Committee, have been cancelled until further notice. Meetings of the Central Emergency Committee and of the Council of the Association will be duly announced in the *Supplement*.

Until further notice the meetings of the Society of Public Analysts and Other Analytical Chemists, normally held on the first Wednesday in October and subsequent months, will not be held.

The annual dinner of past and present students of King's College Hospital Medical School has been cancelled.

EPIDEMIOLOGICAL NOTES

Infectious Diseases for the Week

There was a small increase in the notifications of diphtheria and scarlet fever in England and Wales in the week, but notifications in respect of both diseases remain over 50 per cent. less than in the corresponding week of 1938. No appreciable increase in the incidence of infectious diseases generally has been observed in urban and rural reception areas, although in a few instances a slight trend in this direction is evident. In sparsely populated areas infectious diseases tend to appear in explosive form relatively to the population, and disappear more or less completely for considerable periods. They are more likely to appear among native susceptibles than among evacuated subjects, the majority of whom at school age are themselves immune to the commoner infectious diseases. Perhaps, when schools are reopened generally, spread may be anticipated unless steps are taken to prevent the two classes of children from mingling with each other.

Enteric Fever

Enteric infections remain prevalent in England and Wales, with notifications at 77, the same as in the previous week; notifications were more than twice the average for the four immediately preceding weeks. Nineteen counties were involved, but more than half the cases came from three. Those principally affected were: Yorks (East Riding) 21 (Huddersfield 4, Denholme 3, Bradford 2, Colne Valley 2, Harrogate 2, Barnsley, Dewsbury, Sheffield, Wakefield, Batley, Stanley, Worsborough, Skipton, 1 each); Chester 13 (the same as in the previous week) (Bebington 9, Stockport, Altrincham, Hoylake, Hazel Grove and Bramhall, 1 each); Lancaster 12 (Manchester 4, Bolton 2, Liverpool, Chorley, Fulwood, Irlam, Southport, West Lancashire rural, 1 each); London 6 (Camberwell 2, Lambeth, Wandsworth, Westminster, Woolwich, 1 each); Essex 3 (Southend, Leyton, Chelmsford rural, 1 each); Surrey 3 (Farnham, Guildford, Malden and Coombe, 1 each).

Acute Poliomyelitis

While notifications for the whole country rose from 21 to 30, no fresh case was encountered in London. Kent remains the chief epidemic centre, while Essex, which was severely hit last year, remains free from the disease. Of the twelve counties from which notifications were received there were only five with more than one case—namely, Kent 7 (Canterbury 2, Swale 2, Bexley, Gillingham, Whitstable, 1 each); Lancaster 4 (Manchester 2, Blackpool 1, Newton-le-Willows 1); Middlesex 4 (Yiewsley and West Drayton 2, Hayes and Harlington 1, Potter's Bar 1); Cambridge 2; Yorks (West Riding) 2 (Sheffield and Wharfedale 1 each). As far as can be ascertained the disease is milder than last year, with a decidedly lower proportion of cases developing respiratory paralysis.

Notes on the Table

No returns were received from several districts at the time of preparation of the Registrar-General's weekly return. The figures given last week for Scotland did not include the notifications for Glasgow and Sutherland, which arrived too late for publication. In the Registrar-General's weekly return for the week ended September 9 it was stated: (*a*) the return of deaths relates to civilians only—that is, it excludes the deaths of serving sailors, soldiers, and airmen. (*b*) The births and deaths assigned to towns and other areal divisions of England and Wales are those actually occurring in the respective areas without regard to or adjustment for usual residence. (*c*) Owing to the partial evacuation of populations from London and some of the large towns, the weekly birth and death rates cannot be calculated with accuracy, and are discontinued for the present.

No. 36

INFECTIOUS DISEASES AND VITAL STATISTICS

We print below a summary of Infectious Diseases and Vital Statistics in the British Isles during the week ended September 9, 1939.

Figures of Principal Notifiable Diseases for the week and those for the corresponding week last year, for : *(a)* England and Wales (London included). (b) London (administrative county). (c) Scotland. (d) Eire. (e) Northern Ireland. Median values for the last 9 years for (a) and (b).

Figures of Births Deaths, and of Deaths recorded under each infectious disease, are for : (a) The 126 great towns in England and Wales (including London). (b) London (administrative county). (c) The 16 principal towns in Scotland. (d) The 13 principal towns in Eire. (e) The 10 principal towns in Northern Ireland.

A dash — denotes no cases ; a blank space denotes disease not notifiable or no return available.

Disease	1939					1938 (Corresponding Week)					1930-8 (Median Value Corresponding Weeks)	
	(a)	(b)	(c)	(d)	(e)	(a)	(b)	(c)	(d)	(e)	(a)	(b)
Cerebrospinal fever	16	2	7	—	2	17	3	6	2	—		
Deaths		—	—				1	—				
Diphtheria	782	33	231	31	23	1,184	146	165	59	17		
Deaths	19	—	3	3	1	18	4	4	2	—		
Dysentery	19	1	22		—	33	6	33		—		
Deaths			—	—	—			—	—	—		
Encephalitis lethargica, acute	1	—	—		—	5	—	—		—		
Deaths		—	—				—	—				
Enteric (typhoid and paratyphoid) fever	77	6	8	5	2	36	2	5	9	1		
Deaths	2	—	—	—	—	4	1	—	—	—		
Erysipelas			42	6	3			56	4	5		
Deaths		—	—				—	1				
Infective enteritis or diarrhoea under 2 years												
Deaths	43	4	24	12	10	48	9	7	7	3		
Measles			13		3			37		4		
Deaths	2	—	—	—	—	5	—	—	—	—		
Ophthalmia neonatorum	78	7	25		—	99	9	20	•	1		
Deaths												
Pneumonia, influenzal*	237	18	3		4	307	26	10		4		
Deaths (from influenza)	5	1	1	—	—	9	2	1	1	—		
Pneumonia, primary			78	5				121	6			
Deaths		11		9	4		11		—	6		
Polio-encephalitis, acute	1	—				3	—					
Deaths		—					—					
Poliomyelitis, acute	30	—	1		1	73	6	13		1		
Deaths		—	—				—	2				
Puerperal fever	3	3	7	2	1	2	2	11	5	1		
Deaths		1†					—					
Puerperal pyrexia	163	14	13		2	139	14	20		2		
Deaths												
Relapsing fever	—	—			—	—	—			—		
Deaths												
Scarlet fever	1,106	57	179	39	63	1,625	121	372	65	91		
Deaths	—	—	—	—	—	7	2	3	—	—		
Small-pox	—	—	—		—	—	—	—		—		
Deaths		—	—	—	—		—	—	—	—		
Typhus fever	—	—	—	—	—	—	—	—	—	—		
Deaths			—	—	—			—	—	—		
Whooping-cough			27		1			232		15		
Deaths	8	2	3	1	—	8	1	3	—	—		
Deaths (0-1 year)	277	26	51	30	20	263	43	46	38	9		
Infant mortality rate (per 1,000 live births)						43	35					
Deaths (excluding stillbirths)	4,128	678	544	190	112	3,923	745	597	166	133		
Annual death rate (per 1,000 persons living)			11.0	12.8	9.8	9.6	9.5	12.2	11.2	11.8		
Live births	6,467	905	788	427	210	6,261	1,104	883	403	227		
Annual rate per 1,000 persons living			15.9	28.7	18.4	15.4	14.1	18.0	27.3	20.1		
Stillbirths	223	20	34			247	38					
Rate per 1,000 total births (including stillborn)			41			38	33					

*Includes primary form in figures for England and Wales, London (administrative county), and Northern Ireland.
† Death from puerperal sepsis.

Letters, Notes, and Answers

All communications in regard to editorial business should be addressed to THE EDITOR, BRITISH MEDICAL JOURNAL, B.M.A. HOUSE, TAVISTOCK SQUARE, W.C.1.

ORIGINAL ARTICLES and LETTERS forwarded for publication are understood to be offered to the *British Medical Journal* alone, unless the contrary be stated. Correspondents who wish notice to be taken of their communications should authenticate them with their names, not necessarily for publication.

Authors desiring REPRINTS of their articles published in the *British Medical Journal* must communicate with the Secretary, B.M.A. House, Tavistock Square, W.C.1, on receipt of proofs. Authors over-seas should indicate on MSS. if reprints are required, as proofs are not sent abroad.

ADVERTISEMENTS.—All communications should be addressed to the Advertisement Manager (office hours 9 a.m. to 5 p.m.). Orders for copies of the *Journal* and communications with reference to subscriptions should be addressed to the Secretary, B.M.A. House.

The TELEPHONE NUMBER of the British Medical Association and the *British Medical Journal* is EUSTON 2111.

The TELEGRAPHIC ADDRESSES are

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SECRETARY, *Medisecra Westcent, London.*

The address of the B.M.A. Scottish Office is 7, Drumsheugh Gardens Edinburgh (telegrams: *Associate, Edinburgh;* telephone 24361 Edinburgh), and of the Office of the Cumann Doctúirí na h-Eireann (I.M.A. and B.M.A.), 18, Kildare Street, Dublin (telegrams: *Bacillus, Dublin;* telephone 62550 Dublin).

QUERIES AND ANSWERS

Thumb-sucking

Dr. OCTAVIA LEWIN (London, W.1) writes: The practice of thumb-sucking described by Mr. J. H. Badcock (August 26, p. 476) as being correlated with rhythmic movements of the other hand suggests a restless disposition probably due to some discomfort that might be tracked to its source and combated. Apart from orthodontics and the moulding of the palate and jaws there is an aspect which is often overlooked. The position of the arm weighing on the thorax impedes the symmetrical movements of the lungs. This is the more serious if the one side alone is involved as in the case of "A. N. F." (April 15, p. 808). With the general growth of the child the arm gets heavier and the corresponding side of the chest is less and less fully expanded, and scoliosis is almost certain to occur. There is no need to emphasize the seriousness of this deformity when acquired in this way, and the great difficulty of correcting it and of curing the habit which leads to it, for the thumb is ever present. This last difficulty is not the case with the dummy, which is on an entirely different plane. The dummy is collapsible and is of a fixed size and is easily lost and soon forgotten. As a comforter, if such a thing is necessary, the dummy has all the advantages. The arm is not used to keep it in place, an all-important fact. A worried wife explained to the welfare worker: "When it is a case of losing my husband or giving the child a dummy, give me the dummy every time." But on no account can thumb-sucking be permitted.

Income Tax

Production of Partnership Agreement

"A. I." inquires whether the income tax authorities are within their rights in demanding production of the partnership agreement.

*** The inspector of taxes has no such right, but if production were refused he could bring the matter before the Commissioners, who are legally responsible for making the firm's assessment, and they are entitled to require such evidence as they consider appropriate to a decision as to, for instance, how the assessment should be divided between the partners. The assessment is on the aggregate liability of the firm as such, but the earned income relief and other allowances are determinable by references to the partners' shares. It is a common practice to allow the inspector of taxes to see and take a copy of the partnership agreement, and a refusal to produce it for that purpose would be unwise.

LETTERS, NOTES, ETC.

Amoebic Infection

Dr. F. GORDON CAWSTON (Durban) writes: As amoebae favour the lower bowel it is reasonable to attack them in this position, whatever other treatment is favoured. Adult Zulus often wash out the colon with unheated sea-water. This may well be a primitive attempt at curing amoebiasis and deserves investigation. Any solution employed for emptying the colon before inserting a drug calculated to remove amoebae should be free from anything likely to interfere with its constitution. There is extensive infection among communities living on a vegetarian diet whose stools are predisposed to acidity, and it is suggested that change to a diet consisting largely of meat is beneficial. Oral administration of ipecacuanha powder has been largely displaced by injections of emetine, but these are often ineffective without other treatment, and small and repeated doses of sodium sulphate are indicated in amoebiasis as they are in bacillary dysentery.

Publicity for Health

If the index to the health of a nation is the number of societies formed to promote it, then indeed the British nation should have no need of curative medicine. The *Health Education Year Book,* a useful compilation by the Central Council for Health Education (5s. 6d. post free from 1, Thornhaugh Street, London, W.C.1), brings all these bodies together—more than a hundred of them—and catalogues their activities, many of which are as enterprising as they are ingenious. If anyone interested in some phase of physical or mental welfare desires to impress it on his local community he has only to open these pages to discover where he may obtain plays, posters, films, maps, diagrams, models, lantern slides with or without the lecturer, and any kind of publication from tracts to textbooks. The book is primarily intended for medical officers of health and others associated with the work of local authorities, clerks to insurance committees, secretaries of friendly societies, and social workers in general. Of the various agents of propaganda the film seems to be the most popular, and although sometimes the story is depressing—"The Empty Bed," for instance, which is designed to convince parents of the value of immunization against diphtheria—yet others end as conventional stories should, and "Dirty Bertie" from being a revolting child becomes a bathroom convert. Considerable skill must have gone to the making of cartoon films such as "Giro the Germ." In neatness of titling the National Ophthalmic Treatment Board is unexcelled with such films as "The Eyes Have It" or "Visibility Fair," but the Dental Board runs it close with "Smile if You Dare" and "Practice Makes Perfect." The designs and captions of posters are also often engaging, while as to lectures—some might suppose that the lecture was out of date, yet here is a panel of nearly a hundred lecturers, including some men and women eminent in the medical profession, offering their services.

Bayer Products Ltd.

Mr. F. A. S. Gwatkin, Solicitor to and Director of Bayer Products, Ltd., Africa House, Kingsway, London, W.C.2, writes: An advertisement published for Bayer Products, Ltd., in your issue of September 16 may have led to some misunderstanding. It stated: "Bayer Products, Ltd., is a registered British company and is now neither controlled by nor in communication with any company in Germany." This might imply that Bayer Products, Ltd., was once not a registered British company and was previously controlled by German interests. This is not the case. The company has always been a British company and at no time has any German interest possessed a majority of shares. Moreover, while the German shareholders had the right to appoint certain directors, there was for many years and up to the outbreak of war only one German director, who was in fact resident in England. Of the other directors three are British, a further British director died a few weeks ago, and the remaining director is an American subject."

Messrs. Roche Products, Ltd., have issued a booklet of twenty-four pages entitled "Vitamins in Medical Practice." Copies can be obtained on application to the firm at Broadwater Road, Welwyn Garden City, Herts.